Development of an interior workplace design tool for supporting change management processes

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Declaration

I declare that the work described within this thesis was originally undertaken by me, (Kate Louise Stockton) between the dates of registration for the degree of Master of Philosophy at De Montfort University, 1st October 2012 – 30th June 2014.

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Abstract

It has long been known that the interior design of work spaces has a profound effect on the emotional wellbeing and behaviours of individuals. In particular, the colour of an interior can have profound effect that range from individuals experiencing moods ranging from depression to joy. Less widely known are the emotional and behavioural effects of other interior design components such as those included in this current research. In this respect, in addition to colour, this research includes shape, material, seating, surface texture and style of interior design components.

Although the effects of interior design has been widely recognised the focus of work place design, particularly within manufacturing industries, has been centred around the use of ergonomic and work place efficiency principles. Little thought has been given, when considering interior design of work spaces, to the emotional wellbeing of the individuals working within such environments and in particular the emotions arising during working practice change processes.

The aim of this project, therefore, is to examine the effect of work place design on the sequence of emotional behaviours arising across the change process. It adopts an ‘interior design’ perspective in order to identify how work place design components and their individual characteristics can affect emotional behaviour. As such it includes a wider range of interior design component characteristics than would normally be associated with industrial-based working environments. However, many of these component characteristics have been shown to be highly effective in providing efficient working environments in non-industrial setting that they have been included in this work.

In order to achieve the aims of the research, both a literature review and a questionnaire-based survey have been undertaken. The literature review and survey results have enabled links to be established between management objective changes, emotional behaviours required to achieve those objectives, the interior workplace design components and characteristics that can generate those emotional behaviours.

A spreadsheet-based selection tool was developed for enabling the identification of interior workplace design component characteristics for achieving specific emotional behaviours and suggestions are made concerning its use.

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List of Abbreviations

ID Interior Design
MS Microsoft
SD Standard Division

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Chapter 1 Introduction

1.1 Thesis

The UK Department for Business, Enterprise & Regulatory Reform 2008 report 'Manufacturing: New Challenges, New Opportunities', (BERR, 2008), identified that manufacturers were facing significant change due to global market environments. A key aspect driving this change was the *'accelerated pace of technology exploitation'* in which the development of new technologies were playing a critical role in underpinning *'improvements to productivity and the efficiency of processes, and provide the capacity for firms to develop higher quality or better customised products that allow them to capture higher value components of the value chain.* Technology development is, therefore, creating high levels of process change within manufacturing organisations and it is the ability of organisations to exploit this change is playing a '*fundamental role in maintaining a competitive advantage against lower wage economies.'* to which large sections of UK manufacturing is part of .

The result of these market and technological forces is that 'process change' is becoming the 'norm' within manufacturing rather than as in the past the 'exception'. Under these circumstances 'changing working practices' needs to become a normal part of an employee's working environment. However, any form of change in working practices has consequences since it is accompanying changes in behaviour of those undergoing the change process.

The choices made during design of an interior space, including working areas are well known to have effects on the emotional behaviour of the individuals using these spaces, (Ulrich, 1991; Martin & Guerin, 2005).

The aim of this research is to develop a design support tool for selected workspace characteristics that take account of the emotional responses of the workforce.

1.2 Research Aims and Objectives

1.2.1 Research Aim

It has long been known that the interior designs of work spaces have a profound effect on the emotional wellbeing and behaviour of individuals. Hahn, (Hahn, 2012), for example observing a variety of empty workspaces including those that were unused or contained old or damaged furniture or were untidy; concluded that "*They seemed filled with sadness, with the emotions of loss contained within their empty walls*".

The basic aim of this thesis: is to develop a design support tool for selecting workspace characteristics that take account of the emotional responses or the workforce.

1.2.2 Research Objectives

In order to achieve the main aim of the project the individual objectives are:

1. To identify and classify the characteristics of interior designs of individual work spaces. These characteristics include colour, shape, texture and style of interior design objects within the work spaces.

2. To identify, through literature research, the sequence of emotional behaviour exhibited across 'existing' to 'new' working practice change process.

3. To establish the relationships between interior design characteristics and the basic emotional behaviours.

4. To develop a process of using relationships between interior design characteristics and emotional behaviours to develop a spread sheet based tool for suggesting interior design characteristics which will assist the sequence of tasks required to undertake changes in working practices.

Of particular interest are the interior design aspects of manufacturing work spaces. However, it is recognised that the intended work may have applications to other non-

manufacturing work environments, particularly environments where specific interactions take place. For example, interior spaces, i.e. offices, where providers of particular services such as the offering of legal, financial and health advice meet their clients. This recognition is based on the valid assumption that clients, requiring such services, have a specific set of emotions when entering such work spaces which must be changed to enable them to gain best use of the services offered. For example, clients entering a solicitor's work space may be in a high state of anxiety which must be reduced or changed before an effective dialogue with the service provider can take place. Although not a central objective, this project will bear in mind the additional uses of interior design to such services, during its examination of the change process within manufacturing.

The interior design aspect of work space plays a critical role in determining the emotional behaviour of persons using the space. It also has an effect at a work place level, at an individual interior design component level and at an individual characteristic of an interior design component level. Examples include (i) bright yellow walls in an undertaker's office, (ii) worn or broken furniture in a bank, and (iii) framed photographs of notorious criminals on office walls of a solicitor.

Manufacturing work spaces are places where a diverse range of people meet and interact. These people differ in terms of for example social position, hierarchical position within the company organisation, level of independence they have in determining the type and amount of work they have, and the timing when this work needs to be undertaken.

They also differ in terms of the emotional behaviours they exhibit within their work places. Such behaviours can have positive as well as negative influences on their level of motivation. Here, both employees and employers, (Weinthal, 2011), react through their work activities, to their own and other people's emotions very differently and often without realising it. Workplace emotions, therefore, play a critical role in determining the working culture of an organisation. Both positive and negative emotions arise within workplaces; positive emotions helping employees achieve positive outcomes, such as achieving success within the workplace, while negative

emotions, fear, anger, stress, sadness, decrease the efficiency and effectiveness work is undertaken.

1.3 Research Methodology

To achieve the research objectives the relationships between ‘change management success’, ‘change management behaviours’ and ‘interior design characteristics’ can investigated by collecting information from the following sources, i.e.: (i) published case studies and historical data, and (ii) questionnaires. A questionnaire was developed and posted on web-based discussion forums that focussed on process change and improvement topics such as NWLean, (Kluck, 2014). The criteria used to choose these data collection methods included (i) availability of information concerning both successful and unsuccessful change programmes, (ii) existence of relationships between emotional behaviours and interior design characteristics, (iii) the availability of information at all stages of the change process, (iv) level of personnel and time resources, and (v) length of time period required to collect the data.

1.4 Scope and **Research & Industrial Contexts** of the Research

The following topics are not included in the scope of this research:

i. Identifying and providing understanding of the psychological reasons why such behavioural effects take place during the change process.
ii. Identifying the nature of the relationships between improvement processes and emotional behaviours particularly in terms of the relative effects on the change process of each behavioural type.

In terms of the research context, the general fields of consideration from which knowledge will be drawn include interior design, manufacturing, change processes, change management, process and continuous improvement, and data collection and statistical analysis. The research will be of interest to researchers in the fields of

interior design, change management and applications falling between the two inter-disciplinary fields of study.

In terms of the change management sector this research and its focus on work space interior to influence change management behaviour is highly relevant. There are many problems and challenges facing change management which relate to the speed and complexity of change required and how the existing models can be modified to cope within this environment. New challenges within this environment related to the current research are (i) the change is normally imposed from outside causes so how is it possible to ensure that people still feel part of the decision and solution?, (ii) lack of consensus may arise resulting in failure to get everyone on board with the corporate changes, and (iii) employees resisting change and needing help with the transition to new working processes.

In terms of the industrial context of this research its focus on the interior design sector and its application to work space interiors is highly relevant because:

i. The interior design sector is in a period of high growth with the 2015 *Interior Design*'s annual survey of the top 100 largest firms, identifying that the interior design sector was in a period of genuine business expansion with total fees growing 12% to $3.3 billion with future growth expectations to $3.5 billion. Interior design firms worked on 52,000 jobs up from 49,500 with new construction making up 58% of all projects.
ii. The above survey identified that the type of projects contributing most to this growth were work space interior of buildings in the corporate office, hospitals/medical offices, laboratory/training facilities, schools, court-houses, libraries and colleges/universities.

In terms of the industrial context, the research will focus on enabling interior design components and their characteristics to control the emotional behaviours involved in the development and subsequent implementation and operation of new working

practices within a variety of manufacturing, commercial and service organisations. Here, the globalisation of markets in all industrial and service sectors has led to an escalating rate at which working practices are changing, leading to change management being a significant role of managers and the need for radical changes in how the change management process can be undertaken successfully and rapidly.

1.5 Structure of Thesis

Chapter 2 provides the results of a literature search undertaken to identify the basic interior design components, i.e. colour, shape, material, seating, surface texture and style. For each of these components their individual characteristics are identified, for Colour the individual characteristics would be for example red, blue and black. Once these were established a further literature search and critical literature review was undertaken to identify links between individual components and emotional behaviour of individuals using spaces designed to include such components. This search was also used to identify, at a more detailed level, links between individual component characteristics and space-user emotional behaviours.

Chapter 3 begins by critically reviewing the change management process in order to establish the main phases involved and the factors involved in successful change management programmes. This chapter next examines the types of improvement carried out in manufacturing organisations and the type of improvement processes used to undertake such up-grades. From this critical review a generic set of improvement process steps are identified and each step of this process linked to the main change management process phases. Adapted versions of the Kubler-Ross ‘grief and loss’ model (Kubler-Ross, 1969) are then used to establish the sequence of emotional behaviours that individuals may move through during the improvement change process. A literature review was then undertaken to establish all types of emotions that have been included by change management researchers within the Kubler-Ross model. These were classified into four main change management behaviours and linked to process improvement stages, i.e. to identify which behaviours arose at which stage of the improvement process. It was observed that potential existed for each of these emotional behaviours to arise at any of the

process improvement stages. Hence, the normal practice prior to starting improvement projects is to ensure that personnel are engaged with the change process, and resistance to change is minimised.

Chapter 4 provides an explanation of the research methodology adopted for the collection and analysis of the information needed to identify links between interior design component characteristics and change management behaviours. A major component of the data collection process is the use of a questionnaire sent out to on-line discussion forums that focusing on lean process improvements.

Chapter 5 provides data and statistical measures of the data collected through use of the questionnaire. Here, the statistical analysis of the questionnaire responses was viewed in terms of the levels of qualitative data used to:

- **i.** Identify the interior design components, and their characteristics, to include in the questionnaire survey, (Chapter 2), i.e. the selected characteristics were identified primarily through literature analysis of the opinions of experienced interior designers and their views on the emotions stimulated. In this respect no formal experiments have been reported in the research literature, aimed to determine quantitative values for the relationships between industrial design characteristics and emotional behaviours.
- **ii.** The responses to the survey questions, (Chapter 5), are the qualitative opinions of experienced change management and continuous improvement practitioners.

Hence, both the ‘interior design literature review’ and the ‘questionnaire survey’ information will link qualitative judgements on ‘behaviour responses’ to interior design characteristics. The interpretation of the results of the survey must, therefore, be based on the use of this high level of qualitative data. There is, therefore, a high emphasis on the use of qualitative data and the statistical analysis of this data.

Chapter 5, measurements of the trustworthiness of these data and statistical measures, analysis of the comments made by survey respondents and benefit-harm analysis required to ensure ethical nature of the use of the results.

Chapter 6 discusses the key concepts of the research and the overall summery approach of the research methodology. It will also provide an indication of how the results of the research can be applied within manufacturing environments.

Chapter 7 provides the research conclusions and Chapter 8 highlights further research work.

Chapter 2 Literature Review - Interior Design

2.1 Chapter Introduction

Interior design has been the subject of a large amount of research in many areas including the generation of interior design knowledge, (Baker, 2005), its classification, (Jennings, 2007), its psychological meaning, (Kleeman, 1976; Thomson, 1977; Beever and Blossom, 2009), and the creation of interior design preferences, (Scott, 1993a; Scott, 1993b).

The interior design aspects of 'work spaces' have been of frequent interest to researchers who have examined the effects of interior design choices in a range of work areas, including nursing homes, (Dickinson, 2004), dressing rooms, (Baumstarck and Park, 2010), design studios, (Nemarumane and Mbohwa, 2012), coffee shops, (Waxman, 2006), hotel guest rooms, (Park, Pae and Meneely, 2010; Lo, 2007), home-based work spaces, (Magee and Arch, 2000), conference rooms, (Weber and Read, 2010), offices, (Sailor, Budgen, Londsdale, Turner and Penn, 2009), and retail environments, (Petermans and Van, 2010; Park and Farr, 2007).

Of significant interest to many researchers and practitioners has been interior design's effect on the emotions, (Pullman and Gross, 2004) and the behaviours that emerge from these emotions, (Park and Farr, 2007; Temple, 2001).

This chapter begins by providing a description of the basic components that make up an interior design. The key components relevant to work areas are then selected and the individual characteristics that make up each component are identified and used to select components and characteristics for use in the data collection survey. A critical review of the literature then examines the effects that individual interior design component characteristics have on the emotional working behaviours of personnel undergoing working practice changes.

2.2 Interior Design Components, Characteristics and Emotional Behaviours

The National Council for Interior Design Qualifications (NCIDQ, 2014) defines interior design as "a multi-faceted profession in which creative and technical solutions are applied within a structure to achieve a built interior environment. These solutions are

functional, enhance the quality of life and culture of the occupants and are aesthetically attractive. Designs are created in response to and coordinated with the building shell and acknowledge the physical location and social context of the project."

Pile, (Pile, 2003), defines interior design as describing "a group of various yet related projects that involve turning an interior space into an *effective setting for the range of human activities* that are to take place there".

The NCIDQ, (NCIDQ, 2014), description of the interior design process is more detailed and includes the basic components of interior designs, i.e. as involving, amongst other activities, the selection of components that include colours, materials, finishes, furniture, fixtures and the preparation of plans and specifications for components that include lighting designs and furniture layouts. They emphasise the need for interior designs to "appropriately convey the design concept and to meet socio-psychological, functional, maintenance, lifecycle performance, environmental, and safety requirements".

The Interior Design Profession's Body of Knowledge 2005 Edition (Martin & Guerin, 2005) and Interior Design Guide, AMC Design Centre, (DCE, 1999), identify the following interior design components, i.e.

i. Lighting
ii. Layout
iii. Colour
iv. Shape
v. Material
vi. Seating
vii. Surface
viii. Style

In terms of the above definitions and the interior design components listed in the above literature this current research reduces the number of interior design components considered since the characteristics of the interior design components

removed are governed by external factors these are listed below and not included in this research.

i. Lighting has been identified as effecting emotional behaviors. For example Poldma (Poldma, 2009), has identified how colour and lighting within interior environments can influence “our interrelationships with one another”, change “people’s immediate experiences within spaces” and “alter our perceptual relationships with people”.

In addition, Park and Farr (Park & Farr, 2007) undertook research to establish how a retail store's lighting could “affect the emotional responses that influence consumer shopping behavior”. The results of their study indicated that lighting, particular with respect to colour could lead to changes in customer’s emotional states and behavioral intentions.

ii. Working area layouts are not considered since these need to follow best lean practices for process efficiency and best ergonomic practices for work force health and safety.

The next sections examine each of the remaining interior design components and the individual characteristics associated with each, i.e. Colour, Shape, Material, Seating, Surface and Style, and their links to emotional behaviour.

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2.2.1 Colour Characteristics and Emotional Behaviours

2.2.1.1 Colour Characteristics

Cheung, **(**Cheung, 1997) provides a comprehensive reference document to assist US Army Corps of Engineers when contracting “interior design firms in the development of excellent interiors”. This document classifies colours in terms of:

a) **primary colours**, i.e. red, yellow and blue,

b) **secondary colours** i.e. green, violet and orange that are created by combining two primaries, and

c) **tertiary colours** created by combinations of primary and secondary colours, i.e. yellow-green, blue-green, blue- violet, red-violet, red-orange and yellow-orange.

This current research makes use of the following above colours, i.e. Brown, Blue, Red, Purple (Violet), Green, Yellow, Orange, White, Black, Grey and Pink. These are composed of the three primary colours, (i.e. red, yellow and blue), the three secondary colours, (i.e. green, violet and orange), and one tertiary colour, (i.e. brown - red-violet).

In addition, this research includes white, black and grey which have usage within interior design and the colour 'pink' all of which have known effects on emotions, (Smith, 2008).

A large number of interior designers and interior design researchers, (including Bruce, Benson et al, 2001; Lee, Chang and Kim, 2005; Preddy, 1985; Shen, Chen and Hsu, 1996; Smith, 2008), have made use of these colours within their interiors and research.

2.2.1.2 Emotional Behaviours of Colour Characteristics

There is a small body of research that identifies the limited effect of colours on emotional behaviour, suggesting that its widely recognised effects are myths and preconceptions. However, colour, which is an essential interior design component, has been shown to greatly influence a wide range of emotional behaviour. This is supported by the bulk of the research, including early work by Hemphill, (1996), Mahnke, (1996) and Lang, (1993), who all view colour effects in a similar way to that of later work by Kaya and Epps,(2004), i.e. as "an inseparable part of our everyday lives and its presence is evident in everything that we perceive". According to Eiseman (1998) colour is "one of the strongest physical settings mainly found in interior surroundings".

The research findings, (Barli, Aktan et al, 2012; Brengman, 2002; Guerin, Park and Yang, 1994; Kuller, Mikelides, Janssens, 2009; Kwallek, Soon and Lewis, 2007; Lee and Lee, 2006; Ou, Luo, Woodcock and Wright, 2004; Ou, Luo, Woodcock and Wright, 2004;Ou, Luo, Woodcock and Wright, 2004; Park and Guerin, 2002; Um,

Eum, and Lee, 2002), listed in Table 2.1 has been used to identify the links between colour and there emotional effects are provided in Table 2.2. As an outline a study by Manav, (2007), concluded that colours such as black and grey “tend to evoke negative feelings for example anxiety, boredom and sadness” whereas brighter colors, such as green and yellow, elicit “positive emotions such as happiness” as well as “confidence, relaxation and comfort.”

Colour	**Behavioural Effects**
White	Enables (i) higher levels of productivity; (ii) more productive employees; (iii) improved and higher levels of communication.
Blue	Facilitates (i) openness; relaxation, sensitiveness; comfort; security; (ii) an atmosphere of tranquillity.
Red	Stimulating; creating better atmosphere, associated with strength; related to excitement, vitality and physical power; deeper red shades create a response of power; speeds up motor reactions of work performance; creates energetic and aggressive behaviours; excitement; stimulating; aggression.
Purple	Dignified; stately
Green	Protection; harmony; retiring; relaxing; refreshment; quietness; tiredness; quiet.
Pink	Reduce aggressive behaviour
Grey	Anxiety; boredom; sadness
Black	Anxiety; boredom; sadness
Yellow	Creates hope and inspiration; produces emotionally uplifting effects; speeds up motor reactions; of work performance; Crowdedness; cheerfulness
Brown	Security; stability
Orange	Distress; cheerfulness, speed up motor reactions

Table 2.1: Behavioural Effects of Colours

2.2.2 Shape Characteristics and Emotional Behaviours

2.2.2.1 Shape Characteristics

Shapes are a basic element of interior design components and are made up of three basic types, i.e. geometric, organic and abstract. The primary function of shapes are to add and sustain interest in a design, organise designs into separate elements and direct the eye through the interior design.
Bradley, (2010), identifies three basic shapes, i.e. (i) Geometric shapes that include circles, squares, triangles and diamonds which have recognisable regular patterns, (ii) Natural shapes which are irregular and possess greater number of curves, and (iii) Abstract shapes that are stylized or simplified versions of organic shapes, e.g. stick figures.
Basic shapes chosen for this research focus on the use of geometric shapes and include Angular, Round, Curved, Triangular, Square, Oblong, Semicircle, Circle, Tube, Swirl and Rectangle. Organic shapes are those that are found in nature of which examples are leaves and insect wings. Abstract shapes may be amorphous, conforming to no particular definition or have recognisable simple form, examples are icons and symbols.
Both organic and abstract types of shapes have not been included in this research due to the sheer number of examples that exist.

2.2.2.2 Emotional Behaviours of Shape Characteristics

Assigning emotions to shapes began as early as the 1940's, (Parlova, Sokolov and Sokolov, 2005), in terms of shapes within 2-D cartoons, e.g. "angry" triangles and "loving" circles.

Parlova, Sokolov and Sokolov, (2005) and Sokolov, Sokolov, Pavlova and Bulthoff, (2005), identified shapes that appear less stable are associated with 'anger' and those rotated from their normal vertical position are less angry. These researchers also studied whether emotions were assigned to shapes based on their dynamic appearance, i.e. whether the shapes appeared to be 'stable' or 'unstable'. For example, a triangle laying on its base or point appears stable but rotated from these two positions would appear unstable, see Figure 2.1. For both the oval and triangle

the emotion of ‘joy’ was highly negatively correlated with the degree of rotation from the vertical. However, for the emotion ‘angry’ this correlation held only for the oval shape. Overall they argued that perceived imbalance in shape orientation lead individuals to attribute emotions to them.

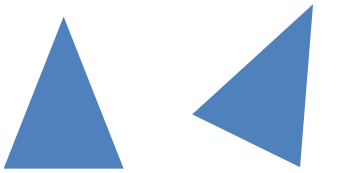

Figure 2.1: Stable & Unstable Shapes

Table 2.2 was assembled by Lu, Suryanarayan, Adams, et. al., (2012), and indicates the complex characteristics of shapes involved in determining the emotions that are associated with them.

Emotion	Features
Angry	Circularity
Disgust	Length of line segments
Fear	Orientation of line segments and angle count
Sadness	Fitness, mass of curves, circularity, and orientation of line segments
Amusement	Mass of curves and orientation of line segments
Awe	Orientation of line segments
Excitement	Orientation of line segments
Contentment	Mass of lines, angle count, and orientation of line segments

Table 2.2: Shape Features associated with Emotions (Lu, Suryanarayan, Adams, et. al., 2012)

Hiraga, (2011), also undertook studies to identify relationships between shapes and emotions with an example of the research output, shown in Figure 2.2, where emotions are Anger (A), Sadness (S), Joy (J) and Fear (F).

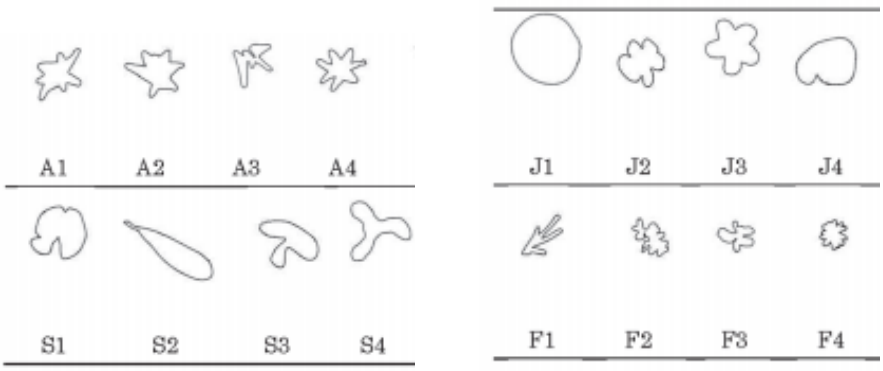

Figure 2.2: Characteristics of Shapes and Related Emotions (Hiraga, 2011)

Table 2.3 provides details of the wide range of research, (Bar and Neta, 2006; Joshi, Datta et al, 2011; Gamper and Alene, 2011; Lu, Suryanarayan and Adams, 2012), that has identified the psychological effects of various shapes. Simple geometric forms tend to evoke stability and completeness while irregular shapes may appear more dynamic and interesting.

Shape	**Behaviour Effects**
Angular and sharp	Energy; lively; young; explosive; violent; anger; rapidity; dynamic; movement
Round	Relaxed
Curved	Happiness; pleasure and generosity
Triangular	When unbalanced - tension; action; aggression; conflict When balanced - self-discovery; revelation progression; stability; direction; purpose; balance; strength; reliability
Square, Oblong & Rectangle	Stability; familiarity; trust; calmness; honesty; order; rationality and formality; honesty; not depressing; optimistic; strength; power; balance; reliability
Crosses	Healing; wisdom; transition; balance; unity; temperance; hope and peacefulness
Circle and semi-circle	Unity; continuity; softness; fluidity; well-roundedness; completeness; warm; comforting; harmony; safety and connection; community; integrity; perfection; tenderness; friendship; care; support; protection; compassion

Swirls and spirals	Creativity; growth; evolution; understanding; trust during change; release; flexibility through transformation
Vertical shapes and lines	Strength; masculinity; power; aggression; courage; brutality; dominate; menacing
Horizontal lines	Tranquillity; calm; rest; weak; peaceful; composed; silent; still; non menacing

Table 2.3: Shape Characteristic Behavioural Effects

2.2.3 Material Characteristics & Emotional Behaviours

2.2.3.1 Material Characteristics

Choosing materials within interior design projects requires consideration of a diverse range of categories and within each category a diverse range of types. Decisions are based on choosing according to functional need, aesthetic preference, cost and availability with materials differing greatly in terms of these criteria.

The USACE *Design Guide for Interiors* DG 1110-3-122 SEPTEMBER 1997 Kisuk Cheung

Materials examined within this research include the following:

Metals which are used extensively within manufacturing environments to meet the structural requirements, for example, work benches which often need to support heavy processing equipment and durable to withstand the repetitive work processes being undertaken. Metals vary greatly in terms of such characteristics as shape, finish, colour, type, reactivity and functionality.

Glass, within working area has many uses including as window, partitions, table tops and as such is available in a wide range of thicknesses, strengths and touchnesses.

In particular within work areas the use of laminated, annealed, fire-rated and safety glass is essential since additional strength and safety characteristics are required.

Ceramic, i.e. Tiles are normally used as a wall finish is within specific functional spaces, for example clean rooms, hospital areas and bathrooms. Its use within work areas for floor finishing is often not allowed for safety reasons. Tiles are available in a range of standard sizes, shapes and a vast range of colours, styles, textures, and thicknesses.

Linoleum, is rarely used now, is a resilient flooring material with broad usage in schools and public buildings because of its relatively low cost, high levels of durability, resilience to wear, oil, grease, contamination and damage. As with tiles linoleum is available in a range of colours, patterns and surface finishes; but unlike tiles it is highly subject to scuffing and marking and continuous care is required to maintain its visual appearance.

Carpets are primarily used in office-based working environments and again are available in a wide range of colours, patterns, textures, fibres, yarns, weave patterns and can be relatively easily cleaned.

Paper, is used as Wallcoverings which is rarely used now, and includes paper, vinyls and textiles available in a wide range of design, colours, textures and patterns. They also have the ability to support complex images. They differ greatly in terms of their durability, resistance to water, cleanability, grease and stain resistance.

Fabric materials as part of upholstery, differ in terms of their pattern, colour, texture and hence their appearance, durability and tactile, i.e. feel. It is the raw materials textiles used to produce fabrics which essentially provide these characteristics.

Additional common materials found in interior design which have been selected for inclusion within this current research are soft furnishings, wood, oak finish and leather.

Paint is not included directly within this current research but is indirectly dealt with through it two basic characteristics, i.e. colour and surface. Although available as a limitless choice of colours are normally only available in three basic surface finishes, i.e. matt, silk and gloss.

2.2.3.2 Emotional Behaviours of Material Characteristics

The review of the literature revealed no published research or practice that directly linked material types and the emotions they elicit. However, a body of research work exists in which the surface texture of materials were directly linked to emotions. Representative examples of work include:

1. Paschke, (2000), argues that emotional response to materials is dependent on their surface appearance and feel. In terms of the latter, a range of textures were identified as, i.e. “smooth to rough and soft to hard”. The emotions exhibited by these material surfaces he suggested were as follows:

Smooth textures - cool, tranquil, precise, unfriendly, austere
Rough textures - attract attention, ease, and warm, informal
Soft textures - friendly, cozy, appealing, inviting
Hard textures - strong, vigorous, aggressive

2. Saar, McGlone and Wasling, (2014), identified the negative effects, (i.e. Irritating, discomfort), and positive effects, (i.e. relaxing, calming, comfortable, exciting, enjoyable, soothing), on persons touching 3 types of materials, (i.e. coarse sandpaper, a soft brush and soft artificial fur). The primary sensory factor was found to be the textural property of the material with other factors being tactile attributes such as wetness.

Differences occurred between the smoother (brush and fur) and rougher (sandpaper) materials: the brush and fur were rated as significantly less negative emotionally than the sandpaper, and there were no significant emotional differences between the brush and fur. The present study directly links the roughness sensory factor with the

pleasantness emotional factor, e.g., where sandpaper was rated as the roughest and most unpleasant.

Using the work of Paschke (2000) and Saar, McGlone and Wasling (2014) the following emotions may be indirectly attributed to the material types, Table 2.4, selected for inclusion in this project.

Material	**Behaviour Effects**
Upholstery fabrics	**Rough textures** - attract attention, ease, warm, informal; **Soft textures** - friendly, cozy, appealing, inviting; relaxing, calming, comfortable, exciting, enjoyable, soothing
Glass	**Smooth textures** - cool, tranquil, precise, unfriendly, austere; **Hard textures** - strong, vigorous, aggressive; Irritating, discomfort
Soft Furnishings	**Smooth textures** - cool, tranquil, precise, unfriendly, austere; **Soft textures** - friendly, cozy, appealing, inviting; relaxing, calming, comfortable, exciting, enjoyable, soothing
Wood, Oak finish	**Smooth textures** - cool, tranquil, precise, unfriendly, austere; **Hard textures** - strong, vigorous, aggressive; Irritating, discomfort
Metal	**Smooth textures** - cool, tranquil, precise, unfriendly, austere; **Hard textures** - strong, vigorous, aggressive; Irritating, discomfort
Carpets	**Rough textures** - attract attention, ease, warm, informal; **Soft textures** - friendly, cozy, appealing, inviting; relaxing, calming, comfortable, exciting, enjoyable, soothing
Paper	**Smooth textures** - cool, tranquil, precise, unfriendly, austere; **Soft textures** - friendly, cozy, appealing, inviting
Lino	**Smooth textures** - cool, tranquil, precise, unfriendly, austere; **Hard textures** - strong, vigorous, aggressive; Irritating, discomfort

Leather	**Smooth textures** - cool, tranquil, precise, unfriendly, austere; **Soft textures** - friendly, cozy, appealing, inviting; relaxing, calming, comfortable, exciting, enjoyable, soothing
Ceramics	**Smooth textures** - cool, tranquil, precise, unfriendly, austere; **Hard textures** - strong, vigorous, aggressive; Irritating, discomfort

Table 2.4: Material Characteristic Behavioural Effects

2.2.4 Seating Component Characteristics

2.2.4.1 Seating Characteristics

Within the armed forces seating is differentiated, see Figure 2.3 into “four common classes: multiple seating, lounge chairs, side chairs, and desk/conference chairs”, (DG 1110-3-122 SEPTEMBER 1997).

This research uses the following chair types illustrated in Figure 2.3, i.e.
:

- **i.** Lounge seating types, i.e. sofa, arm chair, rocking chair, single end sofa
- **ii.** Side chair types, i.e. hard back chair, plastic chair,

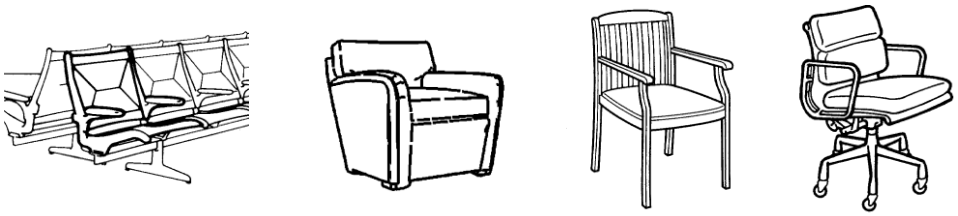

Figure 2.3: Common Classes of Seating

In addition, the following seating types, common in manufacturing environments, are used within the research, i.e. padded stools, metal stools, stream line seating, flat pack seating, stream line seating and Scandinavian seating.

2.2.4.2 Emotional Behaviours of Seating Characteristics

Arney and LaRosa highlight the traditional method of designing chairs and seats based on ergonomic design criteria that ensures they are comfortable and do not, over time, cause discomfort or injury. They also highlight the need to consider the 'pyschology' of seating where changes in design characteristics can affect the ways in which individuals act, collaborate, make a decision, or transition" within a working environment. They illustrate their ideas through several examples of their work, i.e.:

a. In order not to feel anxious, when negotiating, they designed seating that "empowered customers by allowing them to sit forward and upright". This enabled customers to stay longer in the 'negotiating' environment and led to them recommending the experience to their friends. The seating design characteristics employed are important since the desire to negotiate is an essential behavior during "Change Processes".
b. Collaborative environments were created through use of "circular pods" enabling multiple people to share, for example, computer screens hence enabling each person to feel in control whilst at the same time learning from experts.
c. Placing people on the same level through seating such as stools, including when individuals were standing, was found to remove "traditional formality" in terms of job hierarchy and provide environments enabling "spontaneous interaction".
d. Enabling office seats to adapt their form to match the various types of work individual employees undertake during a working day. Examples included seating that provided an upright seat for typing which could convert into a comfortable couch for creative work, "or a round table for collaboration, or high stools to easily circulate in a working group".

They emphasised when selecting seating types to understand "the values and goals of the participants in an interaction" and use this to help "to support them physically and psychologically".

Several research teams have examined the emotions provoked by chair types, i.e.:

1. Sperling, Kristav, Olander, Eriksson and Lekeberg, (2006), elicited user's experiences of easy chairs using qualitative descriptors ranging, for example, from most inviting to most repellent. A number of relationships were established between chair features and emotions, for example "Adjustability was regarded as positive". "Bent wood is nice" and "Looks hard and cold because of the steel-tubes". This research, therefore, elicited user opinions of using the chair rather than its effect on behaviour changers.
2. Office chair designers traditionally base their designs on the need for functional ergonomics, i.e. chairs that support physical comfort and safety. Reijneveld, de Looze, Krause and Desmet, (2003), examined office chair design from the emotional view point, i.e. the "emotional response that is desired by the user". They, therefore, attempted to measure the "emotional responses evoked by office chair appearance."

2.2.5 Surface Component Characteristics

2.2.5.1 Surface Characteristics

Surface, often termed texture, is included as a component since it describes the appearance and/or feel of an objects surface. It includes, therefore, 'sense of touch' in terms of the tactile texture, i.e. nature of a surface, e.g. rough or smooth, and its visual texture, i.e. the visual perception of the surface.

Texture enables additional variety and interest to be included within an interior design as well as affecting the apparent size of an object and perceived colours. Surface texture can also influence the personal emotions aroused about an interior design.

In terms of visual characteristics, the surface texture of an object affects the distribution of light reflected from that object. Here, surface textures are classified into (i) Specular (mirror) reflection in which light is not diffused by the surface, (ii) Semi-specular reflection which diffuses light but still maintains the cohesiveness of

the light pattern, and (iii) Matt reflection where light is diffused and reflected in all directions.

Often surface textures, within interior designs, are described according to their materials. This approach is maintained within this research since it retains the ability to also retain the emotional links associated with these materials. The surfaces, included in this research are those most commonly used in interior designs, i.e. Matt, Gloss, Shiny, Mirror, Granite, Wood, Acrylic, Plastic, Aluminium, Metal and Slate.

2.2.5.2 Emotional Behaviours of Surface Characteristics

As in Section 2.2.3.2 in which the emotional behaviours of material characteristics have been indirectly assigned based on the work of Paschke (2000) and Saar, McGlone and Wasling (2014), i.e. Table 2.5.

Surface	**Behaviour Effects**
Matt	**Rough textures** - attract attention, ease, warm, informal; **Soft textures** - friendly, cozy, appealing, inviting
Gloss & Shiny	**Smooth textures** - cool, tranquil, precise, unfriendly, austere; **Hard textures** - strong, vigorous, aggressive
Mirror	**Smooth textures** - cool, tranquil, precise, unfriendly, austere; **Hard textures** - strong, vigorous, aggressive
Granite & Slate	**Smooth textures** - cool, tranquil, precise, unfriendly, austere; **Hard textures** - strong, vigorous, aggressive
Wood	**Smooth textures** - cool, tranquil, precise, unfriendly, austere; **Hard textures** - strong, vigorous, aggressive
Acrylic	**Smooth textures** - cool, tranquil, precise, unfriendly, austere; **Soft textures** - friendly, cozy, appealing, inviting
Plastic	**Smooth textures** - cool, tranquil, precise, unfriendly, austere; **Soft textures** - friendly, cozy, appealing, inviting
Aluminium & Metal	**Smooth textures** - cool, tranquil, precise, unfriendly, austere; **Hard textures** - strong, vigorous, aggressive

Table 2.5: Surface Characteristic Behavioural Effects

2.2.6 Style Component Characteristics

2.2.6.1 Style Characteristics

The Interior Designipedia **(**http://www.interiordesignipedia.com/interior-design-styles.html) BBC Homes Period Style (http://www.bbc.co.uk/homes/design/period_1930s.shtml) and interiordesign.wikispaces.com/ provide descriptions of the main interior design styles and sub-styles currently known and included current research see below:

Art Deco - represents style that began in Paris in 1908 and continued until 1935 spreading into Europe and then worldwide.

Art Nouveau – Popular between 1880 to 1910 art nouveau was based on nature and the world and not in terms of historical interiors.

Arts and crafts - The arts and crafts style popular between 1860 to 1910 involved recognised painters, designers and writers from Britain who designed high quality and expensive handmade home ware.

Victorian – Popular between 1837 and 1901 and used mass produced interior design goods that were affordable to a wider range of people who started to appreciate the interiors of their homes as a reflection of their social status.

Edwardian - An early 20th century style that derived design inspiration from other interior design styles including Georgian, Medieval and Tudor styles.
Georgian – This style used design needs such as space, harmony, symmetry, airiness, and light.

Retro 1970s - This ethnic-based interior design style included inputs from the hippie, boho chic and funky kitsch designs that were popular in the 1960's.
1930s - Style influences were derived from modernism, art deco, modern, Scandinavian, design historical Tudor, Jacobean and Georgian styles.

1950s - Home interior designs reflected the global design and mass production changes that occurred after the 2nd world war.

Contemporary – this style of interior design became popular in America in the 1950's and early 1960's and was influenced by the ease with which people could now travel across the world by air.

An additional 1990's style not described in reference literature, was included since many personnel involved in manufacturing are likely to have associations with this style.

2.2.6.2 Emotional Behaviours of Style Characteristics

A 1976 study by Chaikin, Derlega and Miller examined the effects of two dramatically different furnishing styles. Researchers noted that when interviewed in two rooms with contrasting furnishings and accessories (one room filled with decorations, cushioned chairs and a rug vs. a bare room with cement block walls and straight black chair) interviewees in the highly decorated room nearly always responded that they felt more comfortable, and conversations with their interviewer grew more intimate. People react more positively to environments which fulfill their social and psychological needs.

Here 'style' also contains personal objects which has been examined, (Miller, Erickson and Yust, 2001), and concluded that "Employees who displayed work-related objects were positively correlated to motivation. Positive correlations between job satisfaction and motivation were demonstrated by display of personal objects and the ability to choose and arrange work area furnishings". Neither this research nor other research has identified links between emotions and interior design styles.

Chapter 3 Literature Review - Change and Behaviours

3.1 The Change Management Process

The definition of “Change Management” used within the current project has been adapted from combining definitions of the change management process provided by **Jansson (2008)**, **Baekdal, Hansen et. al. (2006),** and Prosci (2010) and is “the application of a structured process and set of tools for leading the people side of change to achieve a desired improvement outcome”. Within this definition the primary functions of change management are (i) to provide processes, tools and techniques for managing the people to the side of change, and (ii) to provide a method for reducing and managing resistance to change when implementing a technology or organizational change. Here, Danko, (Danko, 2000), recognises the strategic impact of workplace design on the ability to lead change.

The main phases that make up the change management process are listed in Table 3.1.

Phase 1 - Preparing for change
Phase 2 - Managing change
Phase 3 - Reinforcing change

Table 3.1 Change Management Process

These phases contain detailed activities that a change management team would follow to apply change management to an improvement project. Successful change management requires an intimate understanding of how to align a company’s “culture, values, people, and behaviours such that people are encouraged to achieve the desired results”, (Jones, Aguirre & Calderone, 2004).

Jones, Aguirre & Calderone, (2004) also identify that of these aspects the individual and group behaviours of personnel involved in changes are the most complex to understand and to successfully manage through the change process. Factors to consider are the characteristics of the major structural transformations that may take

place, i.e. (i) scale where changes may affect all of the organisation or a small section; (ii) magnitude which may involve major alterations of the status quo; (iii) duration of change which could last from weeks to years, and (iv) the strategic importance of the changes.

Successful management of change programmes during improvement projects take into consideration such major factors as:

i. Ensuring, prior to starting the changes, that adequate levels of personnel readiness and capacity to change are in place
ii. Creating ownership of the changes
iii. Ensuring that personnel feel the need to change
iv. Building in opportunities to reward participation in changes
v. Identifying and resolving conflicts

Of particular importance is the need to manage and overcome resistance to change where the change management team may need to identify, understand and manage resistance throughout the entire organisation.

3.2 The Improvement Process

The improvement process involves undertaking physical changes to working the environment including work place, work activity and work methods. The change management process, shown in Table 3.1 needs to be carefully integrated into the physical improvement process.

3.2.1 Types of Improvements

The type of improvements undertaken within manufacturing and service industries vary enormously in terms of:

- Organisational level, i.e. enterprise, cross-department, department, departmental section, work area, (Kim, Kim et al, 2008).

- Improvement types required, i.e. cost reduction, lead time reduction, quality improvement, delivery reliability improvement and/or increases in levels of product choice offered to customers.
- The type of wasted material, time, personnel and manufacturing capacity resources reduction, i.e. Transportation and material handling, inventory & work-in-progress, overproduction, waiting, idling and minor stoppages, over-processing, non-added value motions, process & non-process defects, equipment failure from breakdowns, set-up & adjustment and/or reduced processing speed.

Such improvements require changes to working practices that include increasing operator flexibility to enable multi-skilling and movement between processes, changes from batch to flow processing production where operators form part of an assembly line and material flow is controlled through the line, use of standard operating procedures as opposed to reliance on operator experience and judgement, move to operators undertaking their own quality control and routine maintenance tasks, participation in work area/team decision-making in areas of production scheduling, use of team working and allocation of jobs between team members on a daily basis, need to undertake visual planning and control of production.

3.2.2 Types of Improvement Processes

Improvement process methodologies undertaken within organisations differ in terms of the type and number within the improvement team, the improvement activities undertaken and the length of time the process takes. Popular methods, (Bicheno, 2004), include:

i. **Process improvement** which is a strategic approach to service, product and process improvement that seeks to identify, implement and sustain permanent fixes to inefficiencies. In doing so it seeks to identify and permanently resolve the root causes of problems as opposed to the effects they create.
ii. **Continuous improvement** is an on-going process improvement effort that monitors all processes for additional areas of improvement. This process also focuses on implementing preventative measures into improved process in order to identify any future problems that arise.

iii. **Business Process Improvement (BPI)** improves individual or groups of defined business processes (Hammer and Champy, 1994) through improved "organisation of people, materials, energy, equipment, and procedures into work activities designed to produce a specified end result" (Davenport and Short, 1990). BPI can be achieved by changing the state of elements of a business process (Griesberger et al., 2011).

iv. **Lean manufacturing** is an improvement practice that focuses on creating value, i.e. the value stream, for end customers through eliminating or reducing the levels of manufacturing activities and resources that lie outside the value stream and therefore do not contribute or adversely effect to the level of service the customer receives. Alternative approaches are used to undertake lean improvements including the following most popular methods, i.e.

v. **Kaizen Events** which are scheduled improvement exercises which are planned in a 'top-down' fashion, involve a strategic approach to problem solving and are aimed at making significant 'break-through' changes to working practices. They are major projects and are driven by the need to make major improvements in current value stream processes.

vi. **Continuous Improvement** which involves undertaking on-going improvements involving many small projects which may be less than 5 days in length. Again these projects are focussed on improving value stream processes and result in significant changes being generated over time.

3.2.3 Generic Improvement Process Steps

All of the methods outlined in Section 3.2.3 have the basic process steps listed in Table 3.2 in common, i.e. this termed the 'creative problem solving' process, (Isaksen, and Treffinger,1985).

1. Identifying Problems
2. Problem Analysis
3. Problem Definition
4. Generating possible Solutions
5. Analysing the Solutions
6. Selecting the best solution
7. Implementing the best solution
8. Sustaining the implemented solution

Table 3.2 Creative problem solving process

The Problem Solving process consists of a sequence of sections that fit together depending on the type of problem to be solved. These are:

Step 1: Identifying Problems: Here a problem can be simply defined as any activity or resource that does not currently or may not in the future conform to its planned cost, quality and/or delivery target performance. Monitoring the values of these performance metrics is, hence, necessary to identify problem situations using such techniques as statistical process control, accounting ratios and adherence-to-schedule metrics. Frequent monitoring often generates many problem situations that provide opportunities for improvement activities resulting in working environment changes. The amount of change required is often highly dependent on the type of problem and the level of mismatch between actual and target performance metric values

Step 2 Problem Analysis: Here information is actively gathered concerning the current situation of the problem involving who, what, where, why, how and when questions being asked of the problem and its potential causes.

Step 3 Problem Definition: Here the results of the problem analysis stage are used to provide a detailed definition of the actual problem that needs to be solved. Often the original problem may be one of a sequence of effects, Figure 3.1, arising from a root cause. Permanently solving the problem, hence, requires finding and implementing solutions to the root cause.

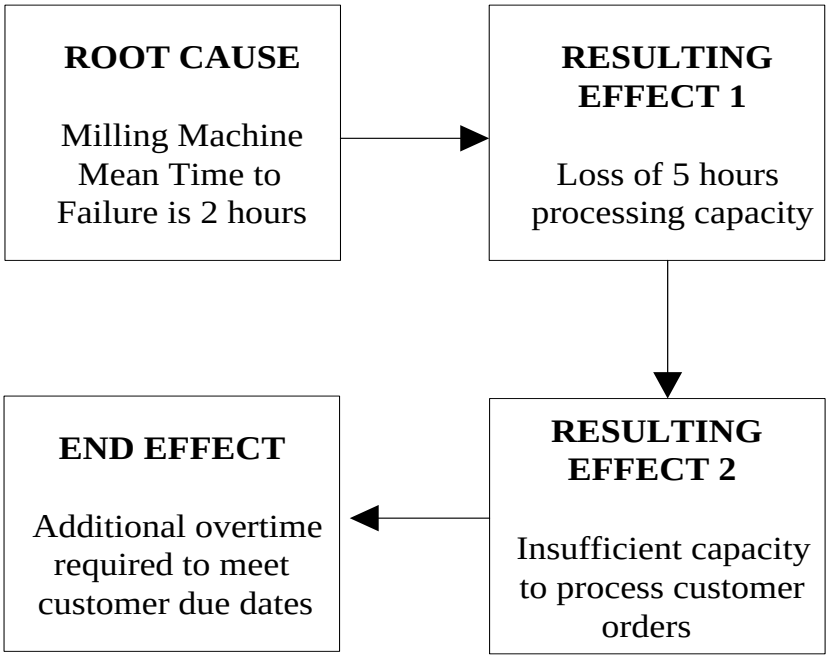

Figure 3.1 Root Cause and Subsequent Effects

Step 4 Generating possible Solutions: This step involves identifying and/or creating alternative solutions to the root cause of the problem. At this stage it is necessary to concentrate on generating a range of solutions, not to pre-judge solutions and not evaluate solutions for their suitability or optimality.

Step 5 Analysing the Solutions: This step involves identifying the criteria by which alternative solutions are compared and the methods used to undertake unbiased and accurate evaluation and comparison of the potential solutions.

Step 6 selecting the best Solution: This step involves using the outputs from the analysis of the solutions to choose the most appropriate one to implement. Often this step requires the expert judgement of personnel who have experience of the problem environment.

Step 7 implementing the best Solution: Here the solution needs to be prepared for implementation, and its implementation competently executed. Here support from personnel affected by changes is required to ensure installation is permanent.

Step 8 sustaining the implemented solution: Staff acceptance of the changes must be maintained and monitoring and auditing used to ensure new processes continue to be used and there are no personnel reverting to former less efficient practices.

Table 3.3 indicates the links between the 'creative problem solving' and the 'change management' processes and indicates the critical need to ensure that all steps in the former process are undertaken.

		Change Management Process		
		Phase 1 - Preparing for change	Phase 2 - Managing change	Phase 3 - Reinforcing change
Generic Process Improvement Process	1. Identifying Problems	✓		
	2. Problem Analysis	✓		
	3. Problem Definition	✓		
	4. Generating possible Solutions		✓	
	5. Analysing the Solutions		✓	
	6. Selecting the best solution		✓	
	7. Implementing the best solution		✓	
	8. Sustaining the implemented solution			✓

Table 3.3 Links between Improvement and Change Management Processes

3.3 Change Management Behaviours

Chapter 2 has primarily focussed on those emotions generated by interior design component characteristics. In this section, a main objective is to identify the relationships between emotions and the change process. In achieving this objective there is a need to examine non-interior design 'emotions' research in order to identify types of emotions involved in the change and improvement processes. In general,

these build on a wealth of research undertaken to identify the fundamental bases of emotions including research within ‘brain sciences’, (Lindquist, Wager, Kober et al, 2011), and investigations, (Diener, E. and Lucas, R.E., 2000; Ortony and Turner, 1990; Mikel, Fredrickson, Larkin et al, 2005), aimed at identifying the full range of emotions and categorising these into hierarchical structures that indicate the similarities between them.

There is also a wide range of research undertaken to establish the influences of emotions on service offerings, (e.g. Brunner-Sperdin and Peters, 2009), and the relationships between product designs and the design process and the emotions they elicit, (Desmet, 2002; Desmet and Dijkhuis, 2003; Desmet and Hekkert, 2002; Desmet, Hekkert and Hillen, 2003; Lazarus, 1991).

Recognising types of emotions and measuring emotions, (Aronoff, 2006; Richins, 1997; Sörensen, 2008), in working environments has also been examined and is essential to making effective interventions when problems begin to occur. However, the benefit of using the interior design approach is that ‘emotional behavioural’ problems are offset, before they occur, through use of effective interior design.

Change transitions, i.e. the psychological process people go through, are an everyday fact of life and include getting married, having a baby and moving house. The most commonly cited reason for change projects failing is neglected consideration of the behavioural effects on staff affected by these changes. This neglect is primarily due to the wide range of behaviours that can occur and the fact that these behaviours change during the period over which changes are being introduced.

Within manufacturing organisations variants of the ‘Grief and Loss’ model, (Kubler-Ross, 1969), Figure 3.2, are used to describe the different behavioural stages that staff, undergoing workplace change, may proceed through.

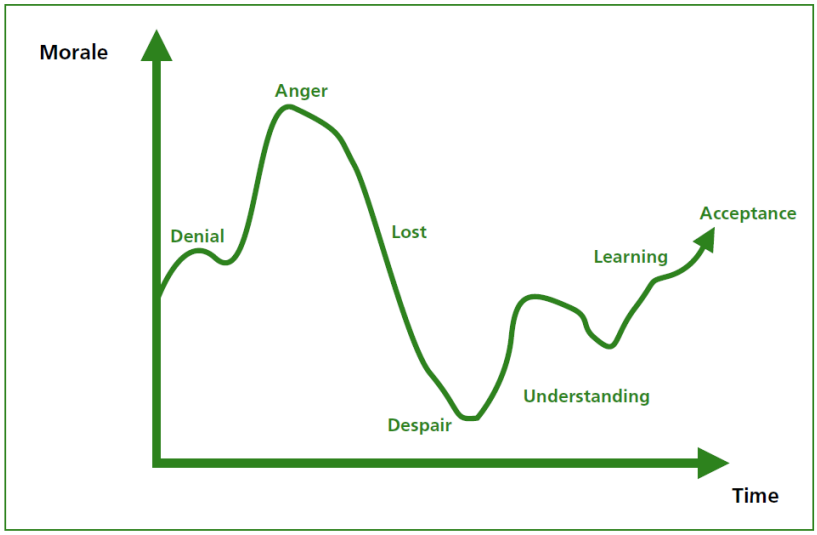

Figure 3.2 The Grief and Loss Model of Change (Kubler-Ross, 1969)

Here, the behaviours which make up the 'Grief and Loss' model are primarily used within manufacturing to indicate the expected behavioural changes that arise when large improvement programmes are introduced. The sequence of behaviours, arising as a reaction to change, are, therefore, generally considered to 1st - denial, 2nd - anger, 3rd – Lost, 4th – despair, 5th – understanding, 6th – learning and 7th – acceptance. Often other terms are used to describe these behavioural stages including bargaining, defensiveness, fear, frustration and hopelessness.

Here, Elrod and Tippett (2002) have identified, compared, and contrasted the various models of the change process "used by diverse and seemingly unrelated" disciplines. Overall, the majority of the models examined adopted Lewin's (Lewin, 1952)" three-phase model" of change. Table 3.4 is reproduced from this work and contains the basic emotions involved in each of the three stages.

Date	Source	Initial equilibrium	Transition	Final equilibrium
1952	Lewin	Unfreezing	Moving	Refreezing
1961	Harvey *et al.*	Unilateral dependence	Negative independence	Conditional dependence, positive interdependence
1967	Fink	Shock	Defensive retreat	Acknowledgement, adaptation, change
1969	Kubler-Ross	Denial	Anger, bargaining, depression	Acceptance
1969	Adams	Dependence	Reaction or rebellion	Coordination and integration
1977	Elgin	Decline	Crisis, muddling through and procrastination, chaos	Back to basics, transformation and revitalization
1982	Lippitt	Shock	Defensive retreat	Acknowledgement, adaptation, change
1989	Rashford and Coghlan	Denying	Dodging	Doing, sustaining
1990	Perlman and Takacs	Equilibrium, denial	Anger, bargaining, chaos, depression, resignation	Openness, readiness, re-emergence
1994	Reynolds	Denial	Resistance	Exploration, commitment
1996	Bupp	Shock, denial	Anger, bargaining, grief	Acceptance, exploration, opportunity, accomplishment, creativity
1996	Grant	Shock/ immobilisation, denial/ minimisation	Depression/ incompetence	Acceptance/letting go, testing, search for meaning, integration
1996	Mariotti		(1) Confusion (2) Immediate criticism (3) Denial (4) Malicious compliance (5) Sabotage (6) Easy agreement (7) Deflection (8) Silence	
1993	Katzenbach and Smith	Working group	Pseudo-team	Potential team; real team; high-performing team
1994	Kegan	Unfreezing	Double-loop unfreezing	Triple-loop unfreezing, and so on

Table 3.4 Basic Emotions used by Researchers within Change Process Models

A more comprehensive list of emotions exhibited during the change process was generated, (Table 3.5), from analysis of a wider selection of change management literature.

CHANGE MANAGEMENT EMOTIONS		MAPPING OF 'EMOTION' LITERATURE REFERENCES (A to N) TO SURVEY BEHAVIOURS				
EMOTIONS IDENTIFIED FROM THE RESEARCH LITERATURE	**EMOTIONS SELECTED FOR LINKING TO INTERIOR DESIGN COMPONENT CHARACTERISTICS**	**REDUCE FEAR & ANXIETY**	**REDUCE RESENTMENT & ANGER**	**REDUCE DEPRESSION & STRESS**	**PROMOTE BARGAINING & DISCOVERY**	**PROMOTE UNDERSTANDING & ACCEPTANCE**
Confused & Chaos	Upset & Ashamed	A, B, C, L				
Fear & Guilt	Upset & Ashamed	A, F, G, L, M				
Paralysed, Immobilisation & Panic	Upset & Ashamed	C, F, J, K, M				
Shock & Stressed	Upset & Ashamed	B, C, D, E, G, I				
Anger & Agression	Angry		A, D, J, L, N			
Blaming, Defensive & Cautious	Angry		A, B, E, H, M			
Resentment & Resistance	Angry		A, B, D, E, M			
Anxiety & Discomfort	Angry		F, M			
Denial & Ignore	Depressed			B, C, D, E, F, H, J, K, L, N		
Depression, Desperation & Despair	Depressed			C, F, G, J, K, L, N		
Disbelief & Doubt	Depressed			C, D, I, M		
Fatigue & Unproductive	Depressed			M		
Unease, Loss & Lost	Depressed			G, K, M		
Skeptical	Depressed			M		
Bargaining	Happy/trusting				H, J, L, N	
Creative, Learning & Discovery	Happy/trusting				M	
Energised, Excitement & Enthusiasm	Happy/trusting				G, M	
Exploration, Experiment& Testing	Happy/trusting				A, B, C, D, E, I, J	
Anticipation, Optimism & Hope	Peaceful/joyous					F, G, K, M
Confidence	Peaceful/joyous					A, C, M
Encouraged & Relief	Peaceful/joyous					F, K, L
Acceptance & Adaption	Peaceful/joyous					A, B, C, D, G, J, L, N
Integration & Involved	Peaceful/joyous					B, D, I, L, M
Commitment	Peaceful/joyous					A, D, E
Openness, Letting go, Capitulation	Peaceful/joyous					K, L
Pragmatic	Peaceful/joyous					M
Productive	Peaceful/joyous					M
Resignation & Satisfaction	Peaceful/joyous					L, M
Understanding	Peaceful/joyous					D, M

Table 3.5 Change Management Phases and Individual Behaviours

Analysis of the change management literature was used to construct Table 3.5 which lists the main emotions of individuals during the change process classified according to the emotions selected for linking to the characteristics of interior design

components. Table 3.5 also identifies the behaviour categories that are used within the questionnaire-based survey section and their links to emotions identified through the literature.

These behaviour categories are (i) Reducing fear and anxiety, (ii) Reducing resentment and anger, (iii) Reducing depression and stress, (iv) Promote bargaining and discovery, and (v) Promote understanding and acceptance. References, A to N, used in Table 3.5 and the change process models they contain are provide along with images of the models in Appendix 1.

When the main change management phases are mapped against the steps involved in the improvement process then Table 3.6 results. This table clearly shows that individual behaviours are not limited to specific improvement process steps but can arise anywhere within the process. The overriding need, therefore, is to ensure that personnel are ‘ready’ prior to the start of the change process. In order to achieve this it is necessary to overcome the main behaviour that can pervade the entire change process which is individuals resisting change.

Here, Kyle, (1993) and Scott and Jaffe (1988) identified that organisation change initiates within individuals a process of resistance which is a natural and normal response to change, Coglan, 1993; Steinburg, 1992; Myers and Robbins, 1991; Nadler, 1981; Zaltman and Duncan, 1977) and one in which individuals both experience change in different ways, (Carnall, 1986) and differ in their ability and willingness to adapt to change, (Darling, 1993).

		Change management behaviours				
		Reducing fear and anxiety	Reducing resentment and anger	Reducing depression and stress	Promote bargaining and discovery	Promote understanding and acceptance
Improvement process steps	Identifying problems	✓	✓	✓	✓	✓
	Problem analysis	✓	✓	✓	✓	✓
	Problem definition	✓	✓	✓	✓	✓
	Generating possible solutions	✓	✓	✓	✓	✓
	Analysing the solutions	✓	✓	✓	✓	✓
	Selecting the best solution	✓	✓	✓	✓	✓
	Implementing the best solution	✓	✓	✓	✓	✓
	Sustaining the implemented solution	✓	✓	✓	✓	✓

Table 3.6 Change Management Behaviours within the Improvement Process

If the effects of changes are not considered and effectively managed then a high level of resistance to change can arise. Table 3.7 lists the range of causes that if not mitigated can lead to a high probability of failure.

Methods of influencing this resistance range from the use of assertive persuasion, through use of rewards and punishment and sharing a common vision of the future. They include initiating and sustaining participation and mutual trust. In addition, positive support, encouragement, co-operation and openness are used to encourage commitment through feeling involved and contributing to the change outcomes.

- Fear of unknown
- Lack of information
- Misinformation
- Historical factors
- Threat to core skills and competence
- Threat to status
- Threat to power base
- No perceived benefits
- Low trust organisational climate
- Poor relationships
- Fear of failure
- Fear of looking stupid
- Reluctant to experiment/take risks
- Bound to closely to tradition and custom
- Reluctance to let go (to relax, speculate, reflect
- Strong peer group norms(need to conform)

Table 3.7 Causes of Resistance to Change

Chapter 4 Research Methodology and Research Design

4.1 Chapter Introduction

Chapters 2 and 3 have provided (i) a critical analysis of the research and published literature of the change management process, (ii) the sequence of emotional behaviours employees move through during change projects, and (iii) the effects of various interior design components on emotional behaviours.

A major objective of the thesis is to identify the relationships between change-based emotional behaviours and interior design components. This chapter provides an explanation of the research methodology adopted for the collection and analysis of the information needed to identify these links.

In addition, this chapter provides details of the actual research programme used to collect and identify these relationships.

4.2 Research Methodology Selection

In order to achieve the research objectives it is necessary to obtain information from which relationships between ‘change management success’s, ‘change management behaviours’ and ‘interior design characteristics’ can be established. Primary items of information needed to be obtained would include descriptions of work place designs undergoing change, descriptions of the changes being actioned and of the previous working environment prior to changes and a quantitative measure of the relative success of the change process.

The alternative Information Collection Methods (ICMs) considered during the research included:

ICM1 Collect interior design and change management information through direct observation of change programmes currently being undertaken in manufacturing industry.
ICM2 Collect interior design and change management information from historical records of change programmes undertaken in manufacturing industry.

ICM3 Collect interior design and change management information from change management case studies reported in the literature.
ICM4 Collect information concerning the emotional responses to interior design characteristics, such as colour and texture, reported in the research and application literature.
ICM5 Collect information through use of survey questionnaires from respondents who have experience of practical change programmes and/or interior design characteristics and/or both.
ICM6 Collect information through directly interviewing personnel with experience of practical change programmes and/or interior design characteristics.

An alternative method, to that of information collection would be information generation using an appropriate modelling technique. However, there are no such modelling systems reported in the research literature or currently available commercially.

Information Criteria (IC) used to select appropriate information collection methods were:

IC1 Availability of information concerning both successful and unsuccessful change programmes.
IC2 Existence of relationships between emotional behaviours and interior design characteristics.
IC3 Availability of information at all stages of the change programme.
IC4 Level of personnel and time resources, and length of time period required to collect the data

Examination of the above information collection methods in terms of their information collection criteria enabled Table 4.1 to be constructed and used to select appropriate information collection methods.

	IC1	IC2	IC3	IC4
ICM1	×	×	×	×
ICM2	×	×	×	✓
ICM3	✓	✓	✓	✓
ICM4	✓	✓	✓	✓
ICM5	✓	✓	✓	✓
ICM6	×	✓	✓	×

Table 4.1 Suitability of Information Collection Methods

The following data collection methods were considered, i.e.:

Published case studies and historical data: A review of the research literature revealed that case studies containing relevant interior design component information had been published along with links to emotional behaviours. This information was collected and analysed during this project. However, insufficient information concerning the links between interior design components and emotional behaviours could be found particularly in terms of the emotional behaviours exhibited during the change process. Historical records held by companies who have undergone change processes do not contain the detail of the emotional behaviours exhibited during the change process to provide rigorous analysis for this project.

Questionnaires and Interviews: The use of a suitable questionnaire was considered a viable information collection tool since it could provide the detail needed and responses from the wide range of existing research and development contacts could be used to ensure validity of the results. Undertaking actual interviews was then not considered for data collection but suitable for validation of the research outputs.

Undertaking direct observations of existing large improvement projects where major process changes are being introduced: Many of these types of projects are currently being undertaken in the UK. Two companies considered making their change projects available for observation to this research. However, this method of

data collection within these companies was not possible since at least 50 days of observation and large numbers of interviews would be required to monitor each work area undergoing change to ensure all relevant information was collected. Both companies determined that the use of five observers, undertaking lengthy periods of observation required would have resulted in industrial-relations problems arising.

4.3 Information Collection and Analysis Process

The sequence of steps shown in Figure 4.1 was used to collect and analyse the information required to establish the links between emotional behaviours and interior design components.

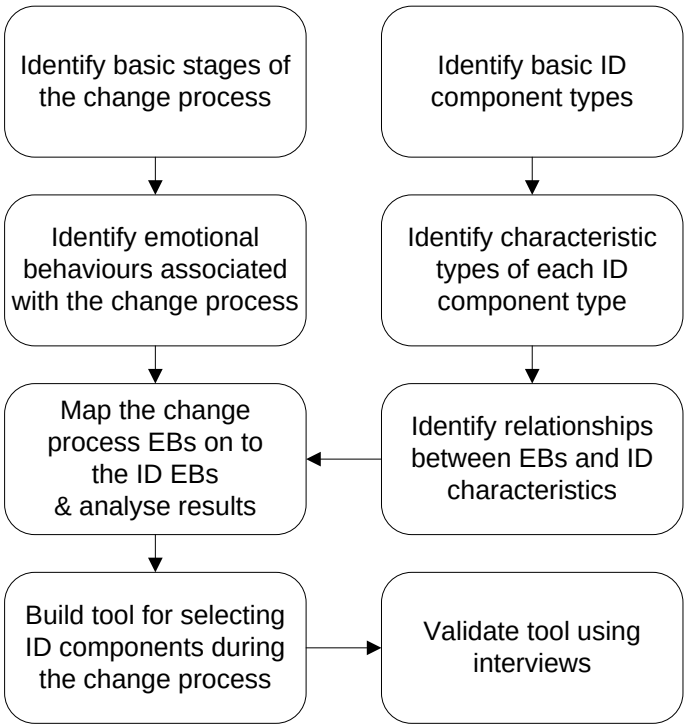

Figure 4.1 Information Collection and Analysis Process

4.3.1 Information Collection

The following information collection process was designed to enable collection of:

1. Identify the emotional behaviours exhibited by personnel involved in change programmes.

2. Identify the basic component types of work place interior designs and the range of features and characteristics of each component type.
3. Link each interior design component type/type feature to the emotional behaviours it arouses.

Survey question 1 asked respondents to provide their opinions on the positive effects of different Colours, (i.e. white, black, brown, blue, red, purple, green, pink, grey, yellow and orange), on the emotional behaviours exhibited during the change process, i.e.: (i) reducing fear and anxiety, (ii) reducing resentment and anger, (iii) reducing depression and stress, (iv) promote bargaining and discovery, and (v) promote understanding and acceptance.

Survey question 2 asked respondents to provide their opinions on the positive effects of different Shapes, (i.e. angular, round, curved, triangular, square, oblong, semicircle, circle, tube, swirl and rectangle), on the emotional behaviours exhibited during the change process.

Survey question 3 asked respondents to provide their opinions on the positive effects of different types of Materials, (i.e. upholstery fabrics, glass, soft furnishings, wood, metal, carpets, oak, paper, lino, leather and ceramics), on the emotional behaviours exhibited during the change process.

Survey question 4 asked respondents to provide their opinions on the positive effects of different Seating styles, (i.e. sofa, padded stools, metal stools, arm chairs, hard back chairs, plastic chairs, flat pack seating, rocking chairs, single end sofas, streamlined seating and Scandinavian seating), on the emotional behaviours exhibited during the change process.

Survey question 5 asked respondents to provide their opinions on the positive effects of different Surface textures, (i.e. matt, gloss, shiny, mirror, granite, wood, acrylic, plastic, aluminium, metal and slate), on the emotional behaviours exhibited during the change process.

Survey question 6 asked respondents to provide their opinions on the positive effects of different furniture Styles, (i.e. art deco, art nouveau, arts & crafts, Victorian,

Edwardian, Georgian, retro 1970's, 1930's, 1950's, 1990's and contemporary/modern), on the emotional behaviours exhibited during the change process.

Survey question 7 asked respondents to provide their opinions on interior design components, (i.e. colour, shape, material, seating, surface and style), and their relative 'positive' effects on the emotional behaviours exhibited during the change process.

Survey question 8 asked respondents to provide their opinions on interior design components, (i.e. colour, shape, material, seating, surface and style), and their relative 'negative' effects on the emotional behaviours exhibited duing the change process.

4.3.2 Information Analysis

The information obtained through the selected data collection methods was firstly analysed using 'quantitative' statistics-based analysis methods, (Hill and Lewicki, 2006), and presented in Chapter 5.

Following on from this a 'qualitative' analysis a critical review was undertaken and the results presented in Chapter 6. The qualitative analysis, used techniques (Cohen and Crabtree, 2008; Devers, 1999; Patton, 2002; Patton, 2003; Rossman and Rallis, 1998; Schwandt, 2001; Williams, 1986; Puhan, Singh, Weiss, Varadhan, and Boyd, 2012), the statistics analysis of the results from the questionnaire and cases from the literature which were studied.

Quantitative Analysis

The range of analyses undertaken, of the information collected, include the following:

i. **Minimum value:** This value identified the interior 'design component characteristic'-'change behaviour' links that had the minimum number of responses.

ii. **Maximum value:** This value identified the interior ‘design component characteristic’-‘change behaviour’ links that had the maximum number of responses.

iii. **Mean:** This value was calculated and used to indicate the degree to which the links between interior design component characteristics and change behaviours were considered by respondents to be ‘real’ relationships, i.e. the greater the mean value the greater the likelihood that the link was a real relationship. This value is used within the results analysis when no extreme ‘outlier’ values of ‘number of responses’ are present.

iv. **Mode:** The "mode" is the value that occurs most often and if no number is repeated, there is no mode for the list. This value was calculated and used to indicate the overall opinion of all respondents to the degree to which the links between interior design component characteristics and change behaviours could be considered by respondents to be ‘real’ relationships, i.e. the higher the mode value the greater is the overall opinion of the respondents that ‘real’ links exist between interior design component characteristics and change behaviours.

v. **Median:** The "median" is the "middle" value in a list of numbers which has been listed in numerical order. This value was calculated and used to indicate the degree to which the links between interior design component characteristics and change behaviours could be considered by respondents to be ‘real’ relationships, i.e. the greater the mode value the greater the likelihood that the link was a real relationship. This value is used within the results analysis when extreme ‘outlier’ values of ‘number of responses’ are present.

vi. **Standard Deviation (SD):** This value was calculated and used to calculate the degree of confidence in the links between interior design component characteristics and change behaviours being ‘real’ relationships, i.e. the larger the standard deviation the more variability in ‘numbers of responses’ and the lower the confidence in ‘real’ links being present.

vii. **Mean + SD:** Percentage responses indicating >68% confidence in an actual relationship existing between individual interior design component characteristics and change behaviours.

viii. **Mean + 2 SDs:** Percentage responses indicating >95% confidence in an actual relationship existing between individual interior design component characteristics and change behaviours. Chapter 6 will also include further discussion of statistical methods used, include:

ix. **Range:** This represents the difference between the **Maximum** and **Minimum** values and is used to indicate the degree to which the respondents have clearly identified distinct differences between the effects of ‘design component characteristic’ on ‘change behaviours’.

x. **Coefficient of variation:** This is the ratio of the standard deviation to the mean, i.e. SD/Mean and is used to account for the uncertain nature of the ‘degree to which respondents can accurately determine the true nature of the links between individual interior design component characteristics and change behaviours. Under these conditions the use of the coefficient of variation helps to remove the of ‘real’ link uncertainty arising from the ‘different types of measurement’ applied by respondents.

Chapter 5 Analysis of Results

5.1 Chapter Introduction

This chapter provides the basic results obtained through statistical analysis of the data collected through the research methods in described Chapter 4, i.e.:

i. Responses collected from the questionnaire survey in terms of the emotional behavioural links to interior design components and characteristics.
ii. Summary of the emotional behavioural links to interior design components and characteristics identified through the literature review.

5.2 Effects of Interior Design Components

5.2.1 Effects of Colour

Survey Question 1 asked respondents to provide their opinions on the positive effects of different Colours on the emotional behaviours exhibited during the change process, i.e.: (i) reducing fear and anxiety, (ii) reducing resentment and anger, (iii) reducing depression and stress, (iv) promote bargaining and discovery, and (v) promote understanding and acceptance. Accumulated results of the survey are shown in Table 5.1 and Figures 5.1a and 5.1b.

	Reduce fear and anxiety	Reduce resentment and anger	Reduce depression and stress	Promote bargaining and discovery	Promote understanding and acceptance	Total Respondents
White	46.67% 7	40% 6	33.33% 5	26.67% 4	53.33% 8	30
Black	0% 0	20% 1	20% 1	60% 3	0% 0	5
Brown	9.09% 1	45.45% 5	18.18% 2	45.45% 5	9.09% 1	14
Blue	37.50% 6	43.75% 7	37.50% 6	43.75% 7	31.25% 5	31
Red	14.29% 1	0% 0	14.29% 1	57.14% 4	14.29% 1	7
Purple	20% 2	20% 2	10% 1	40% 4	50% 5	14
Green	53.33% 8	20% 3	53.33% 8	20% 3	53.33% 8	30
Pink	10% 1	0% 0	60% 6	0% 0	50% 5	12
Grey	33.33% 3	44.44% 4	22.22% 2	11.11% 1	11.11% 1	11
Yellow	16.67% 2	33.33% 4	58.33% 7	41.67% 5	25% 3	21
Orange	16.67% 2	25% 3	66.67% 8	25% 3	8.33% 1	17

Table 5.1 Effects of Colour on the Change Management Process

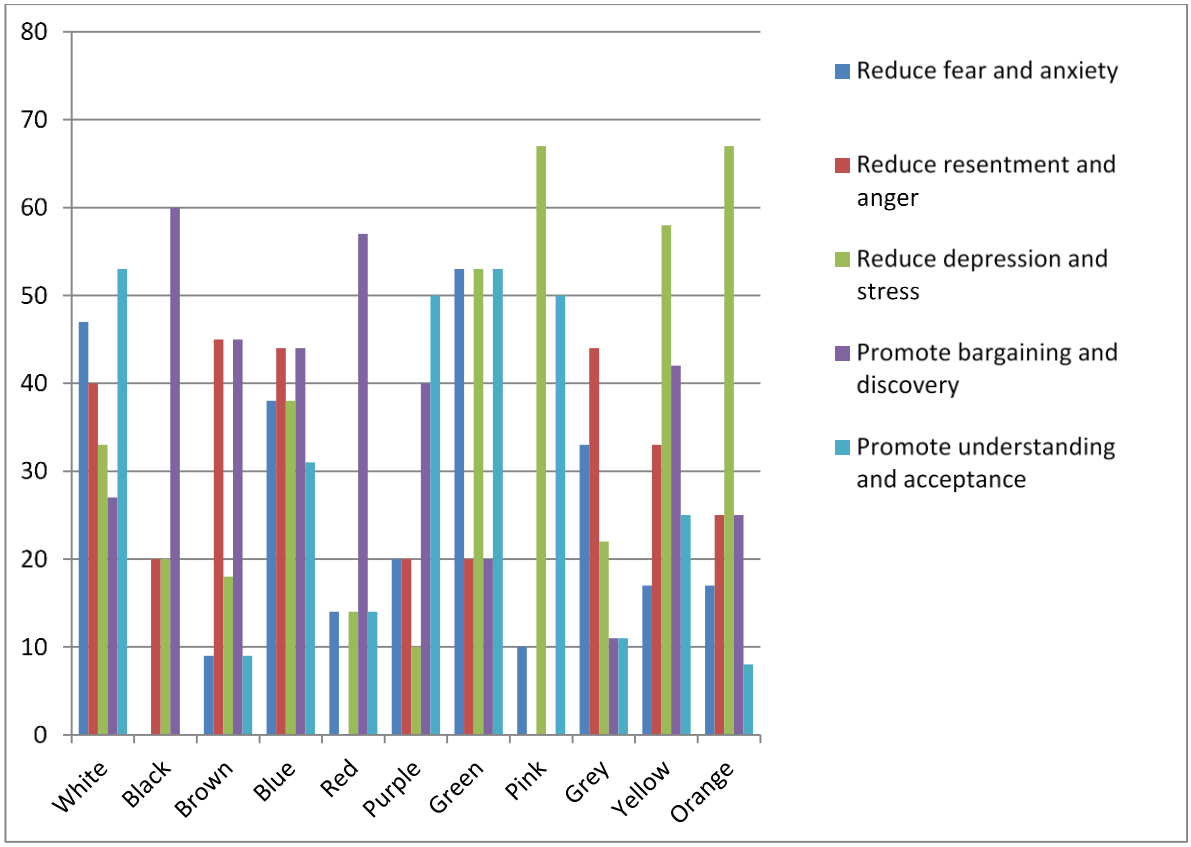

Figure 5.1a: Effect of COLOUR on the change management process
Percentage (%) of Respondents

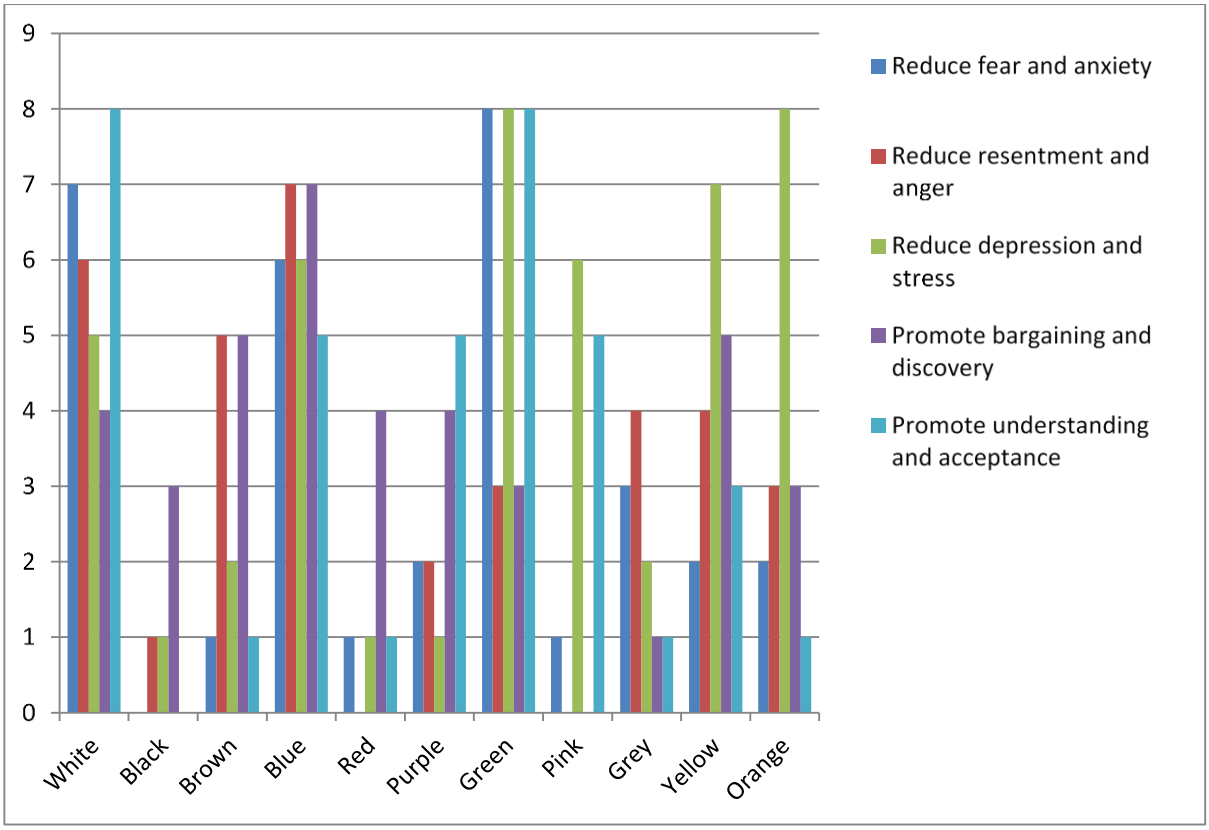

Figure 5.1b: Effect of COLOUR on the change management process
Number of Respondents

5.2.1.1 Results for 'Percentage Responses' - Colour

Using the set of 'percentage quantities', listed in Table 5.1, the statistical information shown in Table 5.2 and Table 5.3 were calculated.

Minimum value	**0%**
Maximum value	**67%**
Mean	**29%**
Mode	**20%**
Median	**25%**
Standard Deviation (SD)	**19%**
Correlation coefficients	**Table 5.3**
Mean + SD	**48%**
Mean + (2SD)	**67%**

Table 5.2 Statistical Results - %Responses - COLOUR

	BEHAVIOURS	Reduce fear and anxiety	Reduce resentment and anger	Reduce depression and stress	Promote bargaining and discovery	Promote understanding and acceptance	CORRELATION COEFFICIENT									
COLOUR		**A**	**B**	**C**	**D**	**E**	**ab** to **ak**	**bc** to **bk**	**cd** to **ck**	**de** to **dk**	**ef** to **ek**	**fg** to **fk**	**gh** to **gk**	**hi** to **hk**	**ij** to **ik**	**jk**
White	**a**	47	40	33	27	53										
Black	b	0	20	20	60	0	-0.90									
Brown	c	9	45	18	45	9	-0.69	0.80								
Blue	d	38	44	38	44	31	-0.75	0.72	0.88							
Red	e	14	0	14	57	14	-0.62	0.81	0.36	0.31						
Purple	f	20	20	10	40	50	0.29	0.12	-0.01	-0.37	0.44					
Green	g	53	20	53	20	53	0.57	-0.75	-0.98	-0.85	-0.37	-0.11				
Pink	h	10	0	60	0	50	0.25	-0.43	-0.66	-0.76	-0.28	-0.03	0.76			
Grey	i	33	44	22	11	11	0.13	-0.31	0.21	0.43	-0.68	-0.68	-0.21	-0.43		
Yellow	j	17	33	58	42	25	-0.77	0.54	0.33	0.29	0.24	-0.37	-0.14	0.38	-0.23	
Orange	k	17	25	67	25	8	-0.60	0.22	0.06	0.21	-0.05	-0.71	0.14	0.45	0.05	0.89
CORRE-LATION COEFFCIENT		**AB** to **AE**	0.37	0.17	-0.38	0.59										
		BC to **BE**		-0.11	0.04	-0.17										
		CD to **CE**			-0.53	0.23										
		DE				-0.47										

Table 5.3 Correlation Coefficients - % Responses - COLOUR

The significant 67% difference between minimum percentage response (0%) and maximum percentage response (67%) indicates that respondents have clearly identified distinct differences between the effects of colours on change behaviours. The survey percentage score for the A-g (53%), C-g (53%), C-h (60%), C-j (58%), D-b (60%), D-e (57%), E-a (53%), E-f (50%), E-g (53%) and E-h (50%) behaviour-colour combinations range between 50% to 60% making their probability of being

actual relationships >= 68% but less than 95%, i.e. >= mean + 1 standard deviation (48%) and <= mean + 2 standard deviations (67%).
The survey percentage score for the C-k behaviour-colour combination is 67% making its probability of being an actual relationship 95%, i.e. mean + 2 standard deviations (67%).

There are no significant 'colour choice' correlations, (i.e. >=0.8), between respondents 'change management behaviours' with the highest correlation being between A & E, i.e. colours selected for reducing 'fear and anxiety' and 'promote understanding and acceptance' where the coefficient of correlation is 0.59.

There are significant 'change management behaviour' correlations, (i.e. >=0.8), between respondents 'colour choices', i.e. b & c (0.80), b & e (0.81), c & d (0.88), j & k (0.89).

5.2.1.2 Results for 'Number of Responses' - Colour

Using the set of 'number of responses', listed in Table 5.1, the statistical information shown in Table 5.4 and Table 5.5 were calculated, i.e.:

Minimum value	**0**
Maximum value	**8**
Mean	**3.5**
Mode	**1**
Median	**3**
Standard Deviation (SD)	**2.5**
Correlation coefficients	**Table 5.5**
Mean + SD	**6.0**
Mean + (2SD)	**8.5**

Table 5.4 Statistical Results – No. of Responses - COLOUR

	BEHAVIOURS	Reduce fear and anxiety	Reduce resentment and anger	Reduce depression and stress	Promote bargaining and discovery	Promote understanding and acceptance	CORRELATION COEFFICIENT									
							ab to ak	bc to bk	cd to ck	de to dk	ef to ek	fg to fk	gh to gk	hi to hk	ij to ik	jk
COLOUR		A	B	C	D	E										
White	a	7	6	5	4	8										
Black	b	0	1	1	3	0	-0.90									
Brown	c	1	5	2	5	1	-0.69	0.80								
Blue	d	6	7	6	7	5	-0.76	0.73	0.90							
Red	e	1	0	1	4	1	-0.63	0.81	0.35	0.32						
Purple	f	2	2	1	4	5	0.29	0.12	-0.01	-0.33	0.44					
Green	g	8	3	8	3	8	0.58	-0.75	-0.98	-0.87	-0.36	-0.11				
Pink	h	1	0	6	0	5	0.27	-0.43	-0.66	-0.77	-0.27	-0.03	0.76			
Grey	i	3	4	2	1	1	0.12	-0.31	0.21	0.41	-0.68	-0.68	-0.21	-0.43		
Yellow	j	2	4	7	5	3	-0.74	0.53	0.33	0.28	0.22	-0.38	-0.14	0.39	-0.22	
Orange	k	2	3	8	3	1	-0.59	0.23	0.06	0.18	-0.05	-0.71	0.14	0.46	0.04	0.89
CORRELATION COEFFICIENT		AB to AE	0.60	0.52	0.25	0.81										
		BC to BE		0.29	0.61	0.30										
		CD to CE			0.02	0.48										
		DE				0.08										

Table 5.5 Correlation Coefficients – No. of Responses - CCCOLOUR

The significant 8 difference between minimum Number of Responses (0) and maximum Number of Responses (8) indicates that respondents have clearly identified distinct differences between the effects of colours on change behaviours.

The survey score ‘number of responses’ for the A-a (7), A-d (6), A-g (8), B-a (6), B-d (7), C-d (6), C-g (8), C-h (6), C-j (7), C-h (8), D-d (7), E-a (8), E-g (8) and E-g (8) behaviour-colour combinations range between 6 and 8 making their probability of being actual relationships greater than (>=) 68% but less than 95%, i.e. mean + 1 standard deviation (6) and mean + 2 standard deviations (8.5) .

There are no behaviour-colour combinations that had survey ‘number of responses’ scores greater or equal to 8.5 that would have made probabilities of their being actual relationships 95%, i.e. mean + 2 standard deviations (8.5), i.e. the highest behaviour-colour combinations was 8 for the A-g combination.

There is one significant ‘colour choice’ correlation, (i.e. >=0.8), between respondents ‘change management behaviours’ ie between A & E, i.e. colours selected for reducing ‘fear and anxiety’ and ‘promote understanding and acceptance’ where the coefficient of correlation is 0.81.

There are significant ‘change management behaviour’ correlations, (i.e. >=0.8), between respondents ‘colour choices’, i.e. b & c (0.80), b & e (0.81), c & d (0.90), j & k (0.89).

Examples of high correlations between ‘colour-change management stages’ are shown in Figure 5.2 and Figure 5.3.

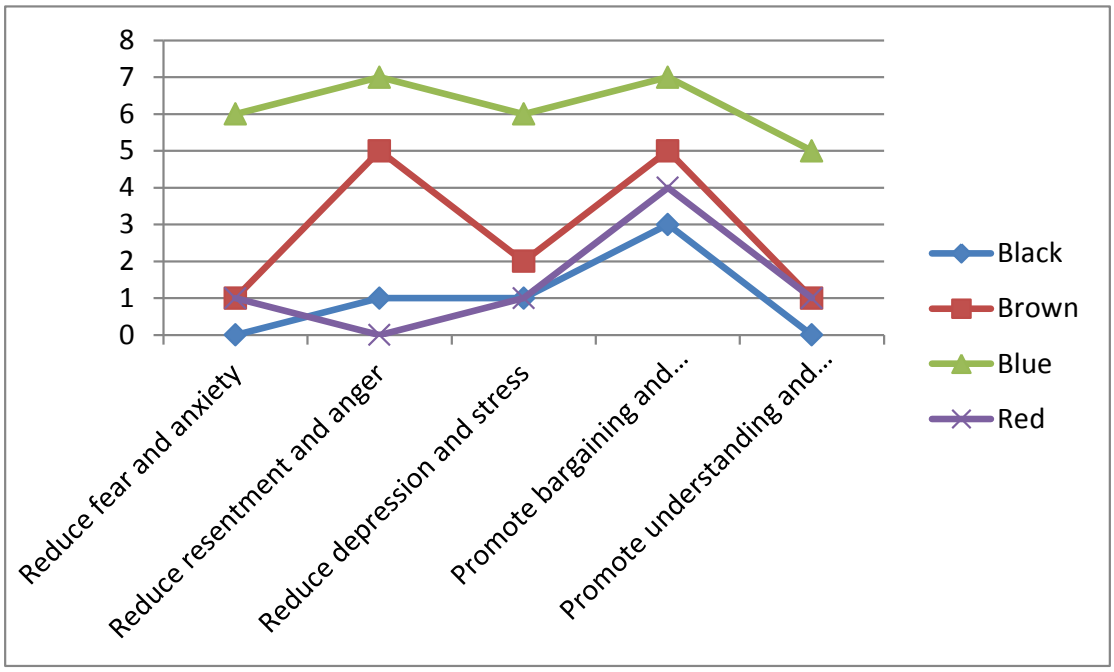

Figure 5.2 Behavioural Correlations of Colours – No. of Responses

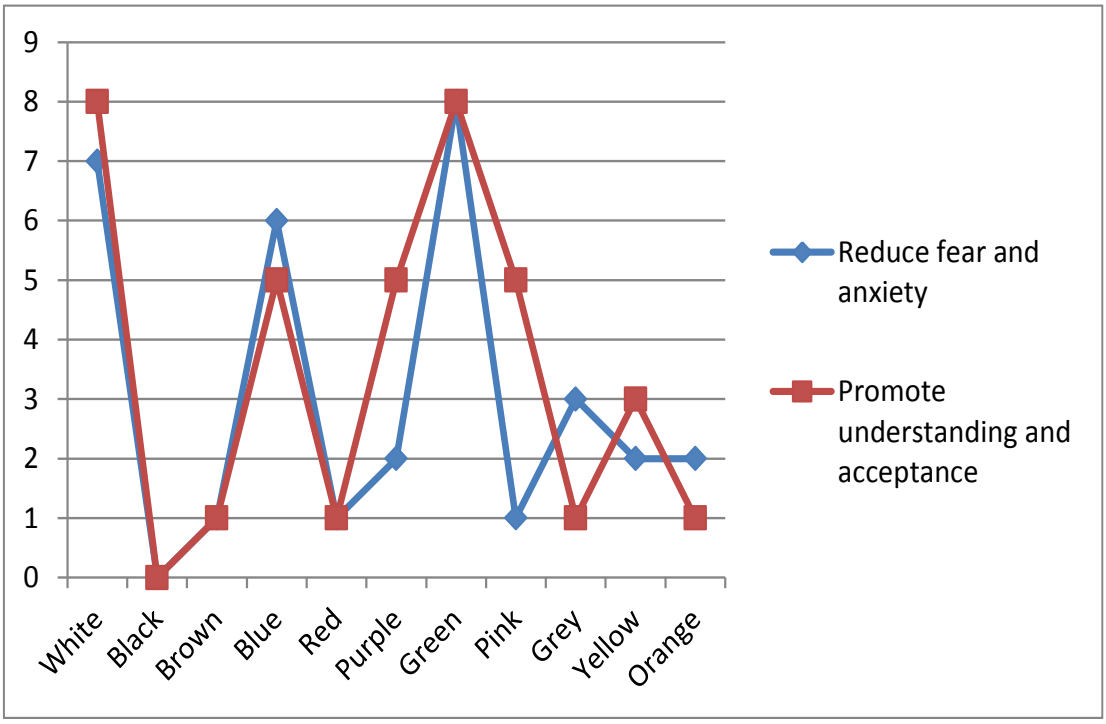

Figure 5.3 Colour Correlations of Behaviours - No. of Responses

5.2.2 Effects of Shape

Survey question 2 asked respondents to provide their opinions on the positive effects of different Shapes on the emotional behaviours exhibited during the change process, i.e.: (i) reducing fear and anxiety, (ii) reducing resentment and anger, (iii) reducing depression and stress, (iv) promote bargaining and discovery, and (v) promote understanding and acceptance.

Accumulated results of the survey are shown in Table 5.6 and Figures 5.4a and 5.4b.

	Reduce fear and anxiety	Reduce resentment and anger	Reduce depression and stress	Promote bargaining and discovery	Promote understanding and acceptance	Total Respondents
Angular	0% 0	25% 2	25% 2	37.50% 3	37.50% 3	10
Round	66.67% 8	41.67% 5	16.67% 2	8.33% 1	25% 3	19
Curved	53.33% 8	40% 6	40% 6	40% 6	20% 3	29
Triangular	0% 0	28.57% 2	0% 0	71.43% 5	0% 0	7
Square	30% 3	20% 2	30% 3	30% 3	30% 3	14
Oblong	0% 0	16.67% 1	50% 3	16.67% 1	33.33% 2	7
Semi Circle	44.44% 4	55.56% 5	44.44% 4	33.33% 3	44.44% 4	20
Circle	62.50% 10	18.75% 3	37.50% 6	31.25% 5	37.50% 6	30
Tube	14.29% 1	28.57% 2	14.29% 1	42.86% 3	14.29% 1	8
Swirl	30.77% 4	38.46% 5	15.38% 2	38.46% 5	23.08% 3	19
Rectangle	11.11% 1	22.22% 2	33.33% 3	33.33% 3	44.44% 4	13

Table 5.6 Effects of Shape on the Change Management Process

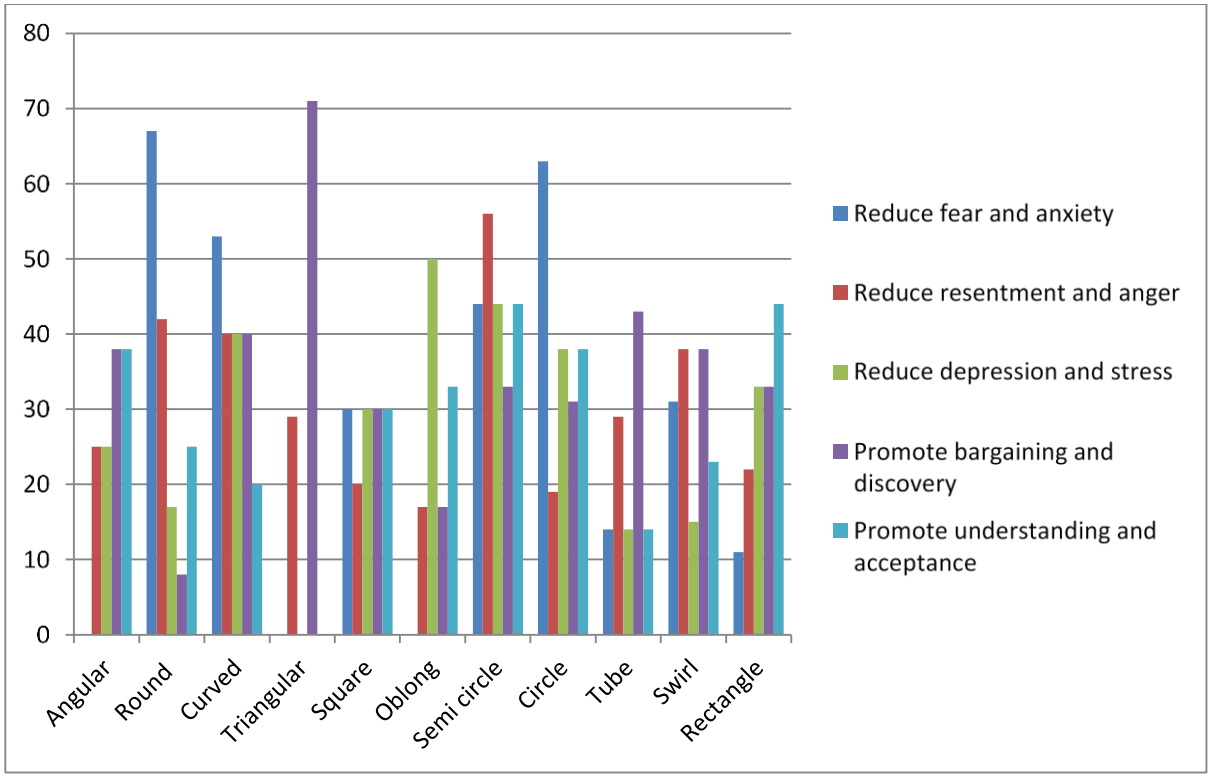

Figure 5.4a: Effect of SHAPE on the change management process
Percentage (%) of Respondents

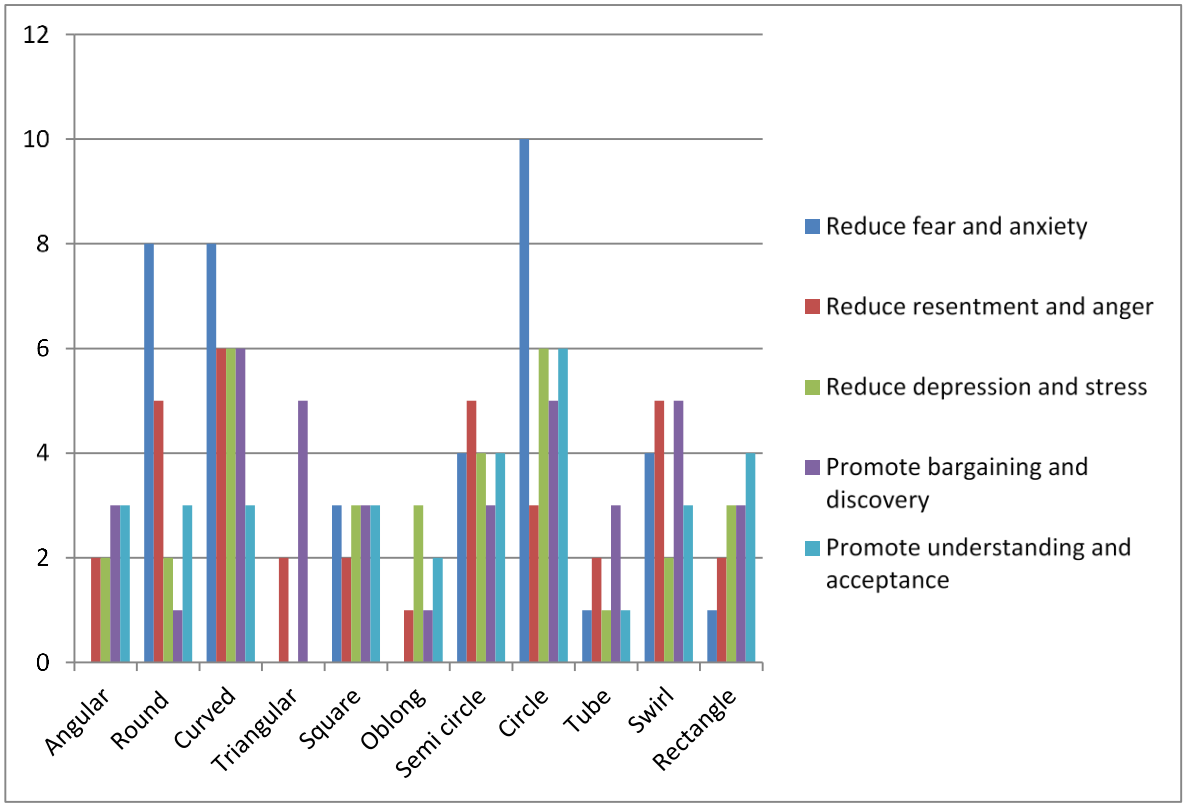

Figure 5.4b: Effect of SHAPE on the change management process
Number of Respondents

5.2.2.1 Results for 'Percentage Responses' - Shape

Using the set of 'percentage quantities', listed in Table 5.6, the statistical information shown in Table 5.7 and Table 5.8 were calculated, i.e.:

Minimum value	**0%**
Maximum value	**71%**
Mean	**30%**
Mode	**38%**
Median	**30%**
Standard Deviation (SD)	**17%**
Correlation coefficients	**Table 5.8**
Mean + SD	**47%**
Mean + (2SD)	**63%**

Table 5.7 Statistical Results - %Responses - SHAPE

	BEHAVIOURS	Reduce fear and anxiety	Reduce resentment and anger	Reduce depression and stress	Promote bargaining and discovery	Promote understanding and acceptance	CORRELATIONS									
SHAPE		**A**	**B**	**C**	**D**	**E**	**ab** to **ak**	**bc** to **bk**	**cd** to **ck**	**de** to **dk**	**ef** to **ek**	**fg** to **fk**	**gh** to **gk**	**hi** to **hk**	**ij** to **ik**	**jk**
Angular	**a**	0	25	25	38	38										
Round	b	67	42	17	8	25	-0.88									
Curved	c	53	40	40	40	20	-0.80	0.54								
Triangular	d	0	29	0	71	0	0.47	-0.48	0.10							
Square	e	30	20	30	30	30	0.01	-0.24	-0.07	-0.16						
Oblong	f	0	17	50	17	33	0.53	-0.68	-0.56	-0.27	0.19					
Semi circle	g	44	56	44	33	44	-0.28	0.51	0.00	-0.45	-0.81	-0.01				
Circle	h	63	19	38	31	38	-0.72	0.57	0.43	-0.51	0.65	-0.34	-0.29			
Tube	i	14	29	14	43	14	0.46	-0.44	0.10	0.99	-0.27	-0.29	-0.35	-0.57		
Swirl	j	31	38	15	38	23	-0.02	0.21	0.31	0.72	-0.50	-0.78	0.03	-0.29	0.76	
Rectangle	k	11	22	33	33	44	0.90	-0.82	-0.90	0.08	0.29	0.73	-0.31	-0.43	0.04	-0.42
CORRE-LATIONS		**AB** to **AE**	0.47	0.21	-0.44	0.16										
		BC to **BE**		-0.05	-0.01	-0.04										
		CD to **CE**			-0.54	0.74										
		DE				-0.59										

Table 5.8 Correlation Coefficients - % Responses - SHAPE

The significant 71% difference between minimum percentage response (0%) and maximum percentage response (71%) indicates that respondents have clearly identified distinct differences between the effects of shapes on change behaviours.

The survey percentage score for the A-c (53%), B-g (56%) and C-f (50%) behaviour-shape combinations range between 53% and 62% making their probability of being actual relationships >= 68% but less than 95%, i.e. mean + 1 standard deviation (47%) and mean + 2 standard deviations (63%).

The survey percentage scores for A-b (67%) and C-h (63%) behaviour-colour combinations are >= 63% making their probability of being actual relationships >=95%, i.e. >= mean + 2 standard deviations (63%).

There are no significant ‘shape choice’ correlations, (i.e. >=0.8), between respondents ‘change management behaviours’ with the highest correlation being between C & E, i.e. shapes selected for reducing ‘depression and stress’ and ‘promote understanding and acceptance’ where the coefficient of correlation is 0.74.

There is a significant ‘change management behaviour’ correlation, (i.e. >=0.8), between respondents d & i ‘shape choice’, i.e. (0.99).

5.2.2.2 Results for ‘Number of Responses’ - Shape

Using the set of ‘number of responses’, listed in Table 5.6, the statistical information shown in Table 5.9 and Table 5.10 were calculated, i.e.

Minimum value	**0**
Maximum value	**10**
Mean	**3.2**
Mode	**3**
Median	**3**
Standard Deviation (SD)	**2.2**
Correlation coefficients	**Table 5.10**
Mean + SD	**5.4**
Mean + (2SD)	**7.5**

Table 5.9 Statistical Results – No. of Responses - SHAPE

	BEHAVIOURS	Reduce fear and anxiety	Reduce resentment and anger	Reduce depression and stress	Promote bargaining and discovery	Promote understanding and acceptance	CORRELATIONS									
							ab to ak	bc to bk	cd to ck	de to dk	ef to ek	fg to fk	gh to gk	hi to hk	ij to ik	jk
SHAPE		**A**	**B**	**C**	**D**	**E**										
Angular	**a**	0	2	2	3	3										
Round	b	8	5	2	1	3	-0.88									
Curved	c	8	6	6	6	3	-0.80	0.54								
Triangular	d	0	2	0	5	0	0.47	-0.48	0.09							
Square	e	3	2	3	3	3	0.00	-0.24	-0.06	-0.15						
Oblong	f	0	1	3	1	2	0.54	-0.68	-0.56	-0.28	0.20					
Semi circle	g	4	5	4	3	4	-0.29	0.51	0.00	-0.48	-0.79	0.00				
Circle	h	10	3	6	5	6	-0.72	0.57	0.44	-0.49	0.66	-0.34	-0.28			
Tube	i	1	2	1	3	1	0.46	-0.44	0.09	1.00	-0.25	-0.29	-0.40	-0.55		
Swirl	j	4	5	2	5	3	0.00	0.19	0.30	0.74	-0.51	-0.77	0.00	-0.30	0.77	
Rectangle	k	1	2	3	3	4	0.90	-0.82	-0.91	0.08	0.29	0.73	-0.31	-0.43	0.05	-0.40
CORRE-LATIONS		**AB** to **AE**	0.70	0.70	0.31	0.64										
		BC to **BE**		0.41	0.36	0.30										
		CD to **CE**			0.31	0.78										
		DE				0.10										

Table 5.10 Correlation Coefficients – No. of Responses - SHAPE

The significant 10 difference between minimum Number of Responses (0) and maximum Number of Responses (10) indicates that respondents have clearly identified distinct differences between the effects of shape on change behaviours.

The survey score ‘number of responses’ for the B-c (6), B-g (6), C-c (6), C-h (6), D-c (6) and E-h (6) behaviour-shape combinations are 6 making their probability of being actual relationships greater than 68% but less than 95%, i.e. mean + 1 standard deviation (5.4) and mean + 2 standard deviations (7.5).
The survey percentage scores for the A-b (8), A-c (8) and A-h (10) behaviour-shape combinations are <= 8 making their probability of being actual relationships >=95%, i.e. mean + 2 standard deviations (7.5).

There are no significant ‘shape choice’ correlations, (i.e. >=0.8), between respondents ‘change management behaviours’ with the highest correlation being between C & E, i.e. shapes selected for reducing ‘depression and stress’ and ‘promote understanding and acceptance’ where the coefficient of correlation is 0.78.

There are significant ‘change management behaviour’ correlations, (i.e. >=0.8), between respondents ‘shape choices’, i.e. a & k (0.90) and d & i (1.0).

Examples of high correlations between ‘shape-change management stages’ are shown in Figure 5.5 and Figure 5.6.

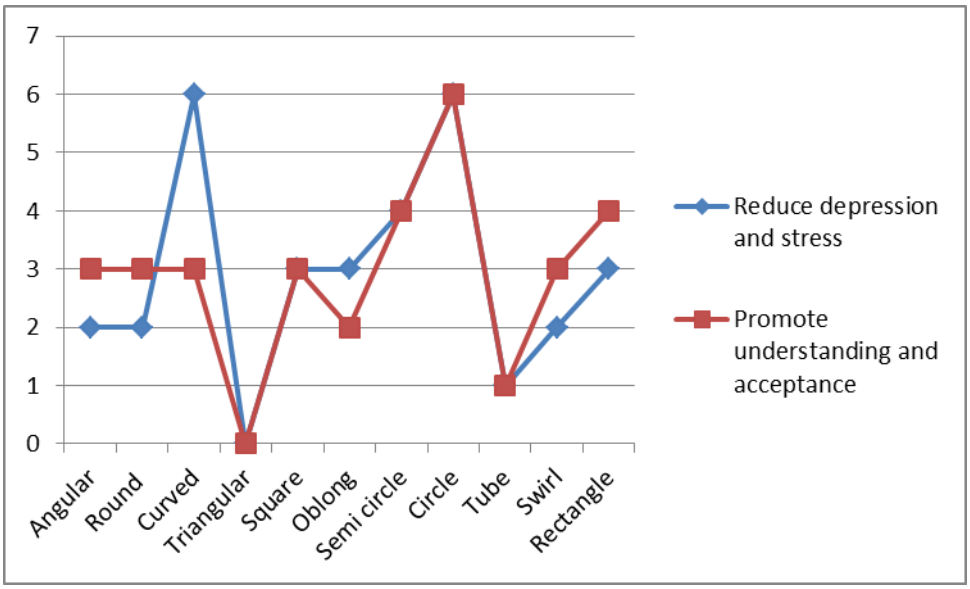

Figure 5.5 Shape Correlations of Behaviours - Nos. of Responses

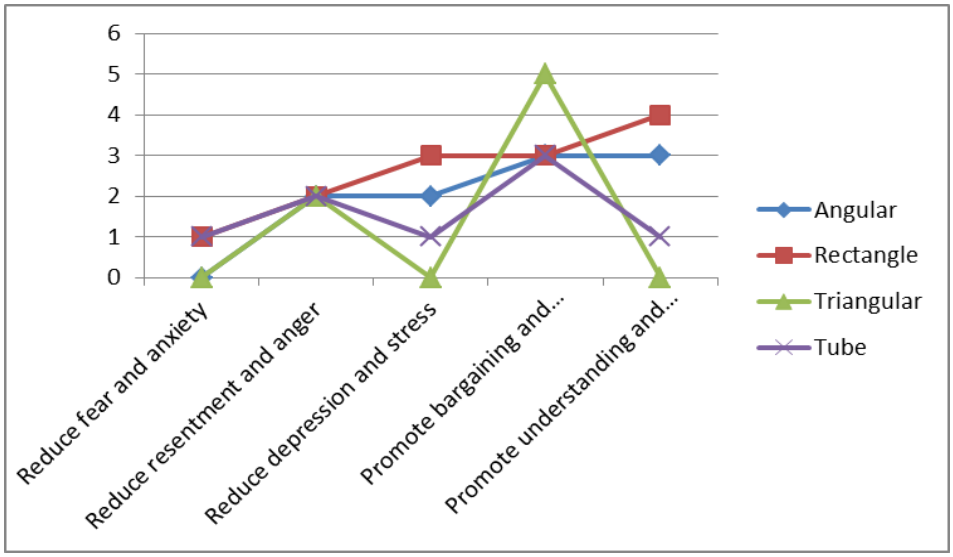

Figure 5.6 Behavioural Correlations of Shapes – Nos. of Responses

5.2.3 Effects of Material

Survey question 3 asked respondents to provide their opinions on the positive effects of different types of Materials on the emotional behaviours exhibited during the change process, i.e.: (i) reducing fear and anxiety, (ii) reducing resentment and anger, (iii) reducing depression and stress, (iv) promote bargaining and discovery, and (v) promote understanding and acceptance. Accumulated results of the survey are shown in Table 5.11 and Figures 5.7a and 5.7b.

	Reduce fear and anxiety	Reduce resentment and anger	Reduce depression and stress	Promote bargaining and discovery	Promote understanding and acceptance	Total Respondents
Upholstery fabrics (Furnishing fabric)	90.91% 10	9.09% 1	36.36% 4	9.09% 1	0% 0	16
Glass	7.14% 1	28.57% 4	35.71% 5	64.29% 9	57.14% 8	27
Soft Fabrics	73.33% 11	33.33% 5	53.33% 8	20% 3	20% 3	30
Wood	43.75% 7	43.75% 7	31.25% 5	25% 4	43.75% 7	30
Metal	0% 0	33.33% 3	11.11% 1	44.44% 4	33.33% 3	11
Carpets	75% 9	33.33% 4	25% 3	25% 3	33.33% 4	23
Oak finsh	21.43% 3	21.43% 3	42.86% 6	28.57% 4	21.43% 3	19
Paper	33.33% 3	22.22% 2	33.33% 3	44.44% 4	55.56% 5	17
Lino	0% 0	0% 0	0% 0	57.14% 4	42.86% 3	7
Leather	28.57% 4	21.43% 3	42.86% 6	21.43% 3	57.14% 8	24
Ceramic	11.11% 1	44.44% 4	22.22% 2	33.33% 3	44.44% 4	14

Table 5.11 Effects of Material on the Change Management Process

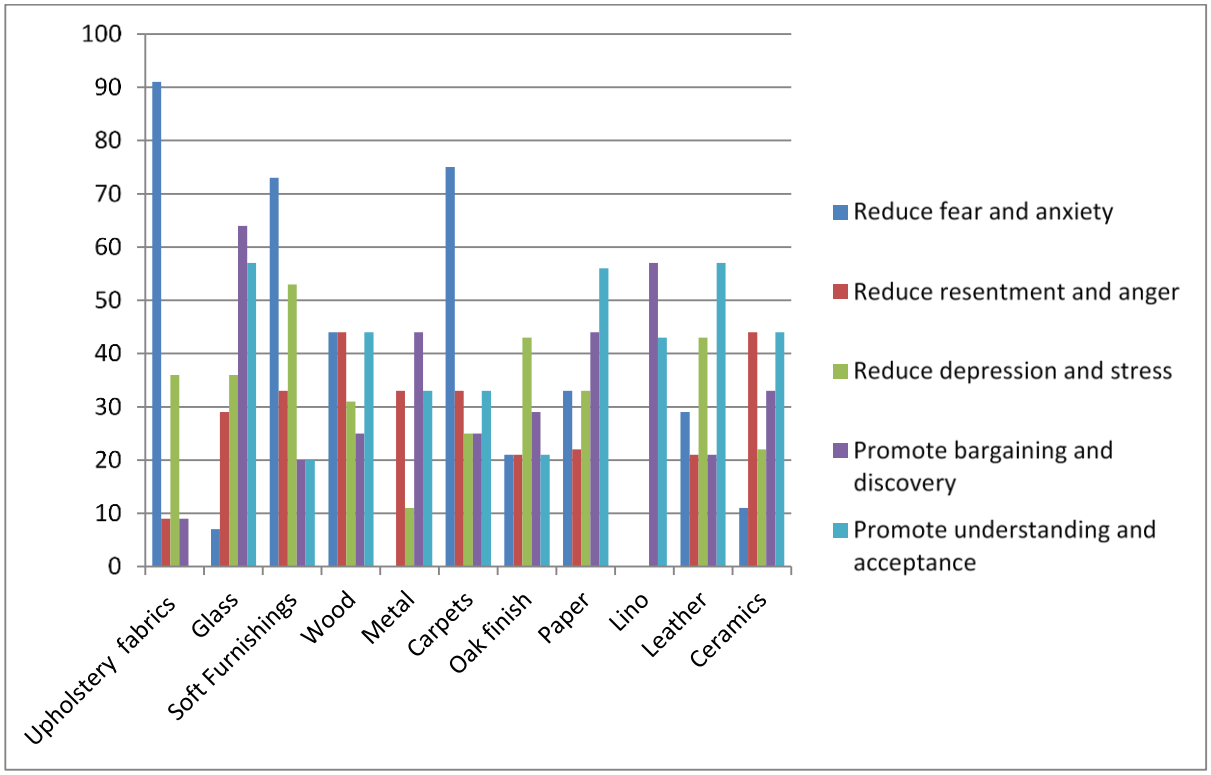

Figure 5.7a: Effect of MATERIAL on the change management process
Percentage (%) of Respondents

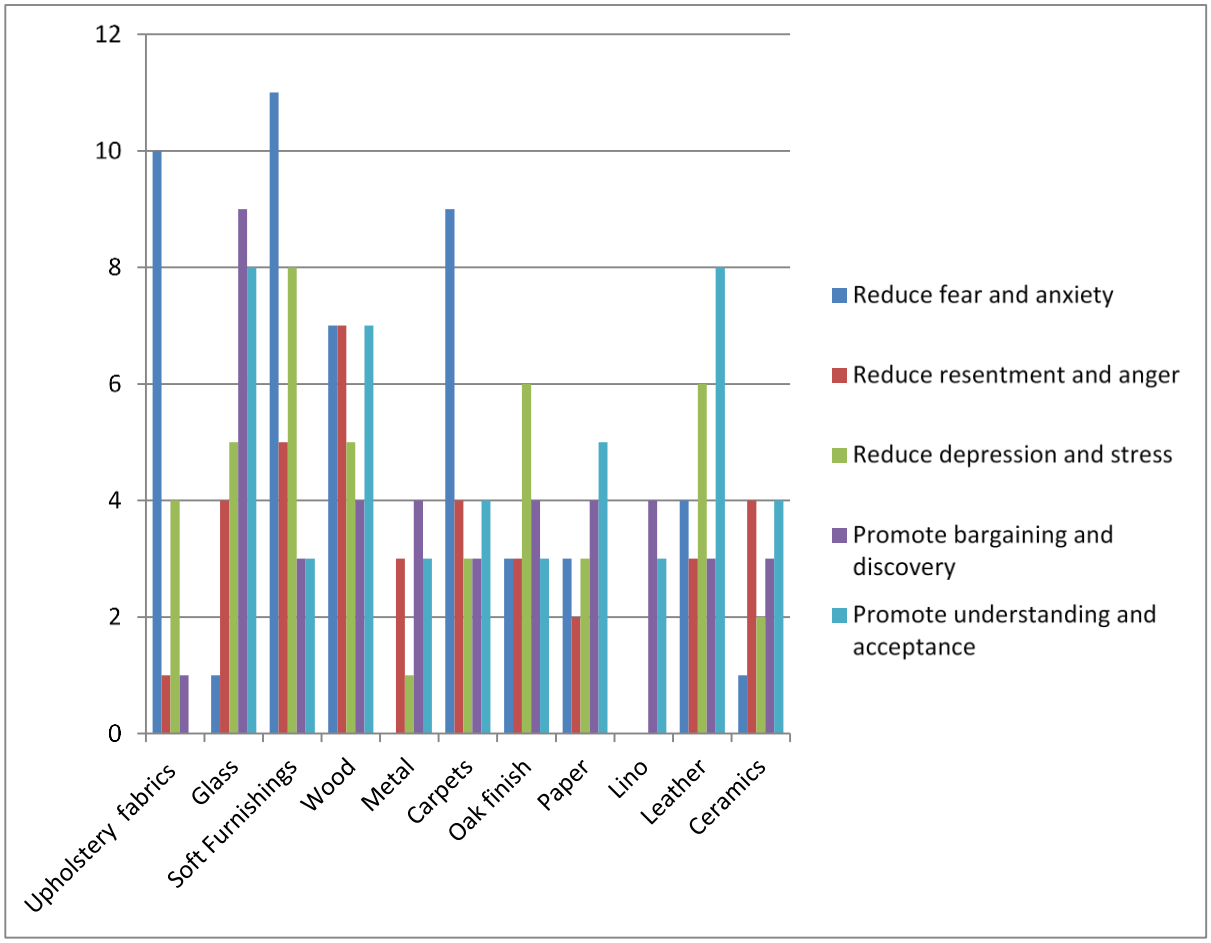

Figure 5.7b: Effect of MATERIAL on the change management process
Number of Respondents

5.2.3.1 Results for 'Percentage Responses' - Material

Using the set of 'percentage quantities', listed in Table 5.11, the statistical information shown in Table 5.12 and Table 5.13 were calculated, i.e.:

Minimum value	**0%**
Maximum value	**91%**
Mean	**32%**
Mode	**33%**
Median	**33%**
Standard Deviation (SD)	**20%**
Correlation coefficients	**Table 5.13**
Mean + SD	**52%**
Mean + (2SD)	**72%**

Table 5.12 Statistical Results - %Responses - MATERIAL

	BEHAVIOURS	Reduce fear and anxiety	Reduce resentment and anger	Reduce depression and stress	Promote bargaining and discovery	Promote understanding and acceptance	CORRELATIONS									
							ab to ak	bc to bk	cd to ck	de to dk	ef to ek	fg to fk	gh to gk	hi to hk	ij to ik	jk
MATERIAL		**A**	**B**	**C**	**D**	**E**										
Upholstery fa	**a**	91	9	36	9	0										
Glass	b	7	29	36	64	57	-0.83									
Soft Furnishing	c	73	33	53	20	20	0.95	-0.90								
Wood	d	44	44	31	25	44	0.22	-0.55	0.25							
Metal	e	0	33	11	44	33	-0.90	0.84	-0.97	-0.31						
Carpets	f	75	33	25	25	33	0.87	-0.79	0.75	0.56	-0.71					
Oak finish	g	21	21	43	29	21	0.00	0.17	0.15	-0.71	-0.19	-0.49				
Paper	h	33	22	33	44	56	-0.35	0.69	-0.51	-0.13	0.35	-0.19	-0.10			
Lino	i	0	0	0	57	43	-0.58	0.88	-0.78	-0.44	0.75	-0.42	-0.13	0.81		
Leather	j	29	21	43	21	57	-0.17	0.25	-0.11	0.24	-0.15	-0.14	0.15	0.65	0.13	
Ceramics	k	11	44	22	33	44	-0.93	0.63	-0.89	0.14	0.84	-0.65	-0.32	0.25	0.43	0.14
CORRE-LATIONS		**AB** to **AE**	0.00	0.51	-0.78	-0.61										
		BC to **BE**		0.20	-0.13	0.21										
		CD to **CE**			-0.52	-0.19										
		DE				0.61										

Table 5.13 Correlation Coefficients - % Responses - MATERIAL

The significant 91% difference between minimum percentage response (0%) and maximum percentage response (91%) indicates that respondents have clearly identified distinct differences between the effects of materials on change behaviours.

The survey percentage score for the C-c (53%), D-b (53%), D-i (57%), E-b (57%), E-

h (56%) and E-i (57%) behaviour-material combinations range between 53% to 57% making their probability of being actual relationships greater than 68% but less than 95%, i.e. mean + 1 standard deviation (52%).

The survey percentage score for the A-a (91%), A-c (73%), and A-f (75%) behaviour-material combinations are between 73% and 91% making their probability of being actual relationships greater than 95%, i.e. mean + 2 standard deviations (72%).

There are no significant 'material choice' correlations, (i.e. >=0.8), between respondents 'change management behaviours' with the highest correlation being between D & E, i.e. materials selected for 'promote bargaining and discovery' and 'promote 'understanding and acceptance' where the coefficient of correlation is 0.61.

There are significant 'change management behaviour' correlations, (i.e. >=0.8), between respondents 'material choices', i.e. a & c (0.95), a & f (0.87), b & e (0.84), b & i (0.88), e & k (0.84) and H & I (0.81).

5.2.3.2 Results for 'Number of Responses' - Material

Using the set of 'number of responses', listed in Table 5.11, the statistical information shown in Table 5.14 and Table 5.15 were calculated, i.e.:

Minimum value	**0**
Maximum value	**11**
Mean	**4.0**
Mode	**3**
Median	**4**
Standard Deviation (SD)	**2.6**
Correlation coefficients	**Table 5.15**
Mean + SD	**6.6**
Mean + (2SD)	**9.2**

Table 5.14 Statistical Results – No. of Responses - MATERIAL

	BEHAVIOURS	Reduce fear and anxiety	Reduce resentment and anger	Reduce depression and stress	Promote bargaining and discovery	Promote understanding and acceptance	CORRELATIONS									
							ab to ak	bc to bk	cd to ck	de to dk	ef to ek	fg to fk	gh to gk	hi to hk	ij to ik	jk
MATERIAL		**A**	**B**	**C**	**D**	**E**										
Upholstery fa	**a**	10	1	4	1	0										
Glass	b	1	4	5	9	8	-0.83									
Soft Furnishing	c	11	5	8	3	3	0.95	-0.90								
Wood	d	7	7	5	4	7	0.22	-0.55	0.26							
Metal	e	0	3	1	4	3	-0.90	0.83	-0.97	-0.32						
Carpets	f	9	4	3	3	4	0.86	-0.78	0.75	0.56	-0.70					
Oak finish	g	3	3	6	4	3	0.01	0.14	0.17	-0.68	-0.21	-0.49				
Paper	h	3	2	3	4	5	-0.34	0.70	-0.51	-0.16	0.35	-0.19	-0.10			
Lino	i	0	0	0	4	3	-0.58	0.89	-0.78	-0.45	0.75	-0.42	-0.16	0.81		
Leather	j	4	3	6	3	8	-0.19	0.27	-0.13	0.24	-0.13	-0.16	0.16	0.65	0.14	
Ceramics	k	1	4	2	3	4	-0.93	0.62	-0.89	0.14	0.84	-0.64	-0.32	0.24	0.43	0.16
CORRE-LATIONS		**AB** to **AE**	0.32	0.58	-0.52	-0.28										
		BC to **BE**		0.51	0.20	0.49										
		CD to **CE**			0.04	0.26										
		DE				0.62										

Table 5.15 Correlation Coefficients – No. of Responses - MATERIAL

The significant 11 difference between minimum No. of Responses (0) and maximum No. of Responses (11) indicates that respondents have clearly identified distinct differences between the effects of materials on change behaviours.

The survey score ‘number of responses’ for the A-d (7), A-f (9), B-d (7), C-c (8), D-b (9), E-b (8) and E-j (8) behaviour-material combinations range between 7 and 9 making their probability of being actual relationships greater than 68% but less than 95%, i.e. mean + 1 standard deviation (6.6).
The survey percentage score for the A-a (10) and A-c (11) behaviour-material combinations makes their probability of being actual relationships >95%, i.e. mean + 2 standard deviations (9.2).

There are no significant ‘material choice’ correlations, (i.e. >=0.8), between respondents ‘change management behaviours’ with the highest correlation being between D & E, i.e. materials selected for ‘promote bargaining and discovery’ and ‘promote understanding and acceptance’ where the coefficient of correlation is 0.62.

There are significant ‘change management behaviour’ correlations, (i.e. >=0.8), between respondents ‘material choices’, i.e. a & c (0.95), a & f (0.86), b & e (0.83), b & i (0.89), e & k (0.84) and h & i (0.81).

Examples of high correlations between ‘shape-change management stages’ are shown in Figure 5.8 and Figure 5.9.

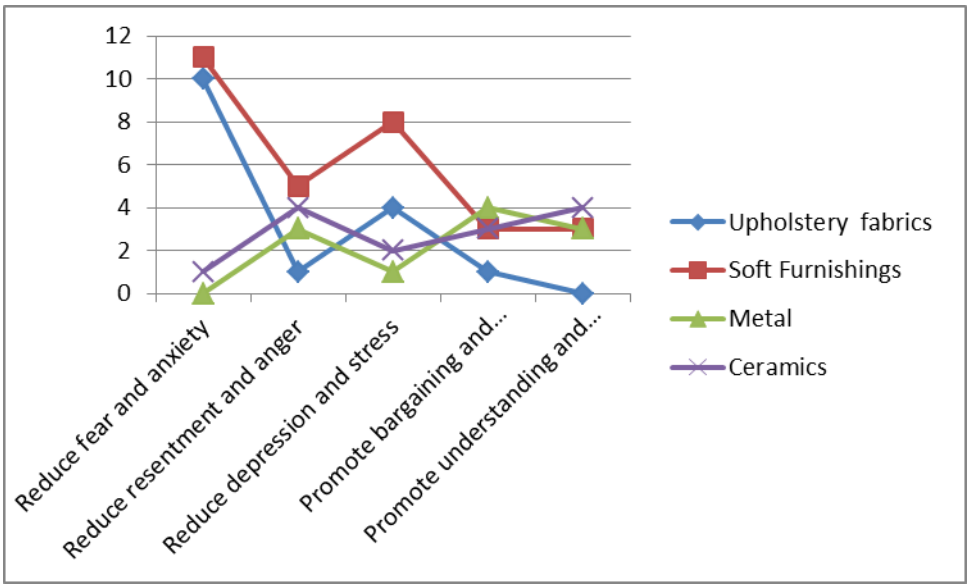

Figure 5.8 Behavioural Correlations of Materials – No. of Responses

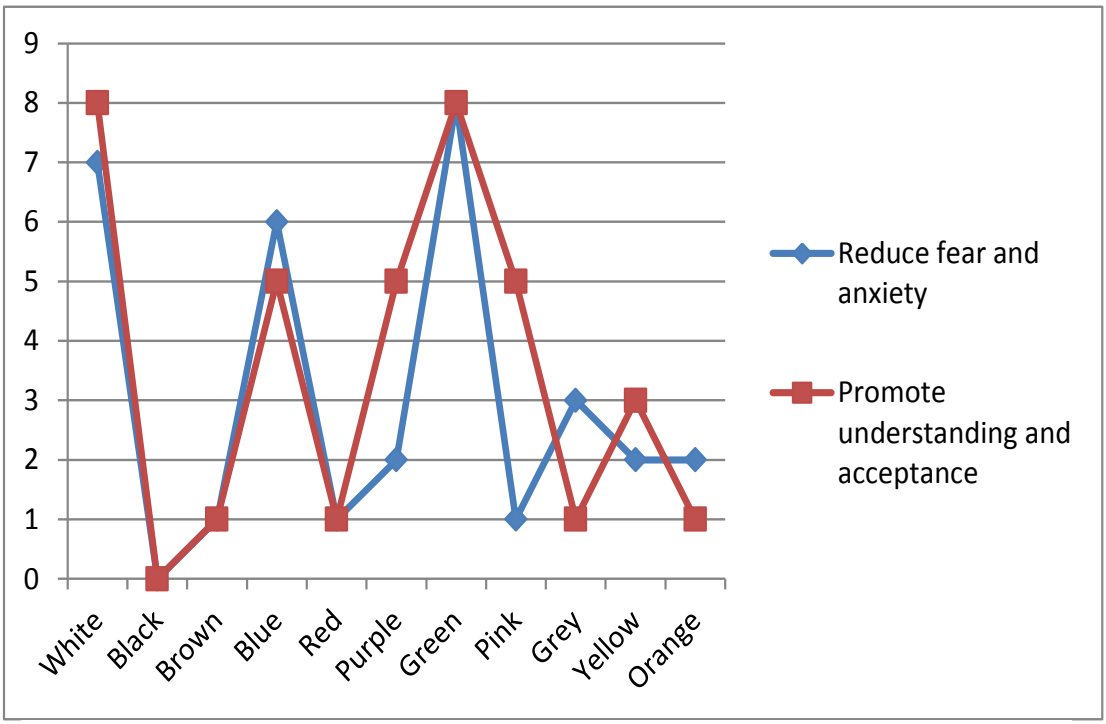

Figure 5.9 Material Correlations of Behaviours - Nos. of Responses

5.2.4 Effects of Seating

Survey question 4 asked respondents to provide their opinions on the positive effects of different seating styles on the emotional behaviours exhibited during the change process, i.e.: (i) reducing fear and anxiety, (ii) reducing resentment and anger, (iii) reducing depression and stress, (iv) promote bargaining and discovery, and (v) promote understanding and acceptance.

Accumulated results of the survey are shown in Table 5.16 and Figures 5.10a and 5.10b.

	Reduce fear and anxiety	Reduce resentment and anger	Reduce depression and stress	Promote bargaining and discovery	Promote understanding and acceptance	Total Respondents
Sofas	75% 12	43.75% 7	50% 8	18.75% 3	31.25% 5	35
Padded stools	18.18% 2	27.27% 3	27.27% 3	36.36% 4	45.45% 5	17
Metal stools	0% 0	14.29% 1	0% 0	57.14% 4	28.57% 2	7
Arm chairs	66.67% 10	33.33% 5	60% 9	13.33% 2	46.67% 7	33
Hard back chairs	11.11% 1	22.22% 2	11.11% 1	44.44% 4	33.33% 3	11
Plastic chairs	0% 0	0% 0	0% 0	80% 4	20% 1	5
Flat pack seating	0% 0	16.67% 1	0% 0	66.67% 4	16.67% 1	6
Rocking chairs	46.15% 6	30.77% 4	69.23% 9	7.69% 1	23.08% 3	23
Single end sofa	11.11% 1	33.33% 3	22.22% 2	33.33% 3	0% 0	9
Stream line seating	0% 0	11.11% 1	44.44% 4	22.22% 2	44.44% 4	11
Scandinavian styled seating	30% 3	10% 1	40% 4	50% 5	30% 3	16

Table 5.16 Effects of Seating on the Change Management Process

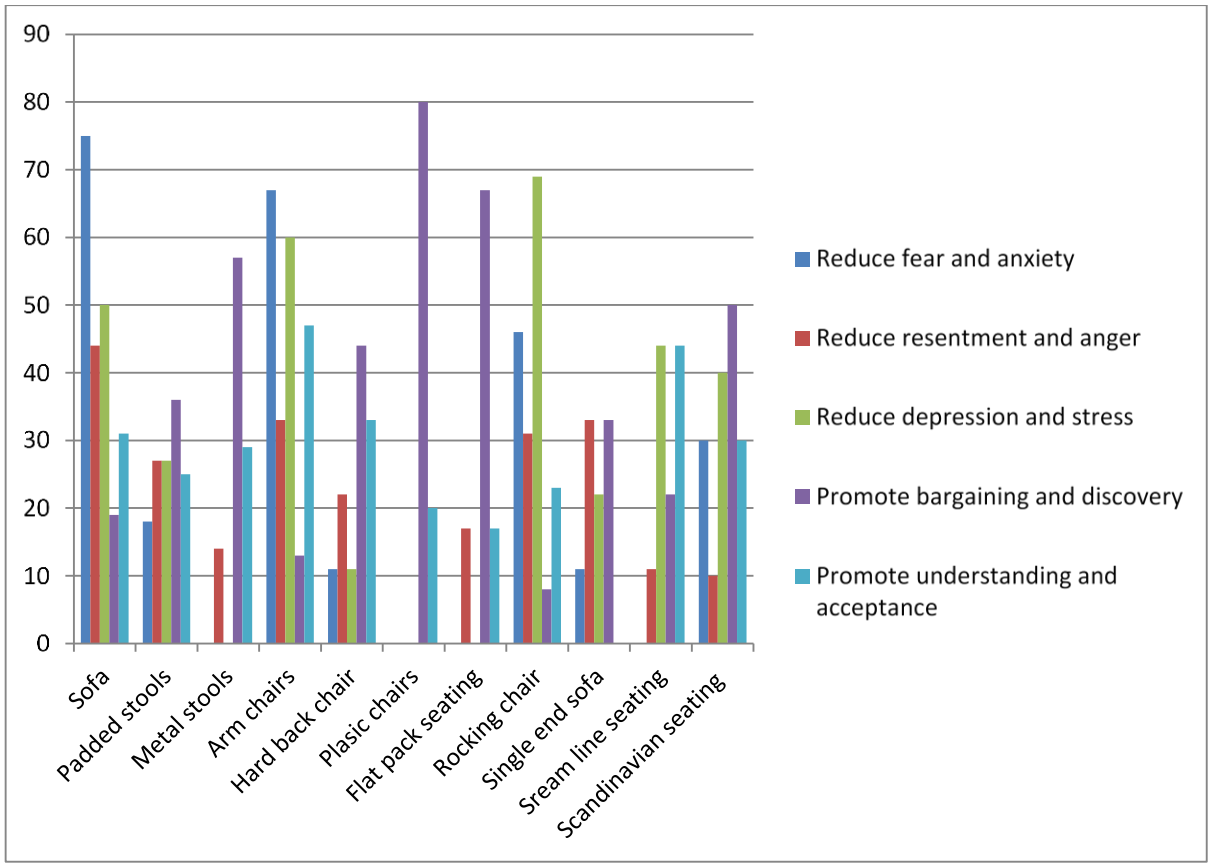

Figure 5.10a: Effect of SEATING on the change management process
Percentage (%) of Respondents

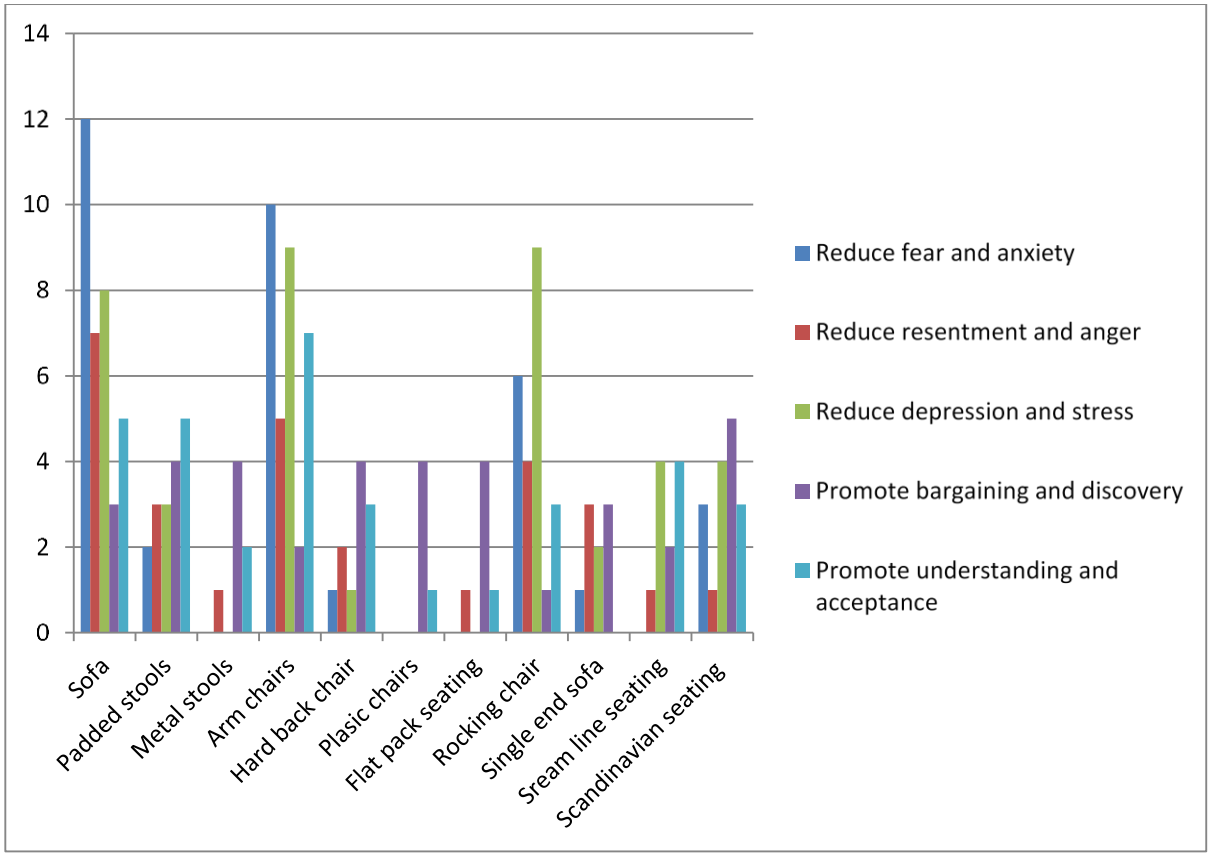

Figure 5.10b: Effect of SEATING on the change management process
Number of Respondents

5.2.4.1 Results for 'Percentage Responses' - Seating

Using the set of 'percentage quantities', listed in Table 5.16, the statistical information shown in Table 5.17 and Table 5.18 were calculated, i.e.:

Minimum value	**0%**
Maximum value	**80%**
Mean	**28%**
Mode	**0%**
Median	**27%**
Standard Deviation (SD)	**21.3%**
Correlation coefficients	**Table 5.18**
Mean + SD	**49%**
Mean + (2SD)	**71%**

Table 5.17 Statistical Results - %Responses - SEATING

	BEHAVIOURS	Reduce fear and anxiety	Reduce resentment and anger	Reduce depression and stress	Promote bargaining and discovery	Promote understanding and acceptance	CORRELATIONS									
							ab to ak	bc to bk	cd to ck	de to dk	ef to ek	fg to fk	gh to gk	hi to hk	ij to ik	jk
SEATING		**A**	**B**	**C**	**D**	**E**										
Sofa	**a**	75	44	50	19	31										
Padded stools	b	18	27	27	36	25	-0.88									
Metal stools	c	0	14	0	57	29	-0.88	0.81								
Arm chairs	d	67	33	60	13	47	0.84	-0.88	-0.89							
Hard back cha	e	11	22	11	44	33	-0.90	0.76	0.99	-0.87						
Plasic chairs	f	0	0	0	80	20	-0.76	0.81	0.95	-0.81	0.89					
Flat pack seati	g	0	17	0	67	17	-0.81	0.86	0.96	-0.93	0.91	0.97				
Rocking chair	h	46	31	69	8	23	0.70	-0.53	-0.89	0.81	-0.92	-0.76	-0.83			
Single end sofa	i	11	33	22	33	0	-0.27	0.64	0.26	-0.63	0.18	0.33	0.49	-0.15		
Sream line sea	j	0	11	44	22	44	-0.50	0.31	0.14	0.02	0.19	0.08	-0.02	0.15	-0.30	
Scandinavian s	k	30	10	40	50	30	-0.35	0.48	0.47	-0.19	0.36	0.68	0.49	-0.09	0.03	0.36
CORRE-LATIONS		**AB** to **AE**	0.74	0.78	-0.69	0.35										
		BC to **BE**		0.56	-0.74	-0.04										
		CD to **CE**			-0.90	0.42										
		DE				-0.36										

Table 5.18 Correlation Coefficients - % Responses - SEATING

The significant 80% difference between minimum percentage response (0%) and maximum percent response (80%) indicates that respondents have clearly identified distinct differences between the effects of seating types on change behaviours.

The survey percentage score for the A-a (75%), C-a (50%), C-d (60%), C-h (69%), D-c (57%), D-g (67%) and D-k (50%) behaviour-seating combinations range between 50% to 69% making their probability of being actual relationships greater than 68% but less than 95%, i.e. mean + 1 standard deviation (49%).

The survey percentage scores for the A-a (75%) and D-f (80%) behaviour-seating combinations makes their probability of being actual relationships >95%, i.e. mean + 2 standard deviations (71%).

There are no significant ‘seating choice’ correlations, (i.e. >=0.8), between respondents ‘change management behaviours’ with the highest correlation being between A & B, i.e. seating selected for reducing ‘fear and anxiety’ and reducing ‘resentment and anger’ where the coefficient of correlation is 0.78.

There are significant ‘change management behaviour’ correlations, (i.e. >=0.8), between respondents ‘seating choices’, i.e. a & d (0.84), b & c (0.81), b & f (0.81), b & g (0.86), c & e (0.99), c & f (0.95), c & g (0.96), d & h (0.81), e & f (0.89), e & g (0.91) and f & g(0.97).

5.2.4.2 Results for ‘Number of Responses’ - Seating

The significant 12 difference between minimum No. of Responses (0) and maximum No. of Responses (12) indicates that respondents have clearly identified distinct differences between the effects of seating on change behaviours.

Using the set of ‘number of responses’, listed in Table 5.1, the statistical information shown in Table 5.19 and Table 5.20 were calculated, i.e.:

Minimum value	**0**
Maximum value	**12**
Mean	**3.1**
Mode	**1**
Median	**3**
Standard Deviation (SD)	**2.8**
Correlation coefficients	**Table 5.20**
Mean + SD	**5.9**
Mean + (2SD)	**8.7**

Table 5.19 Statistical Results – No. of Responses - SEATING

	BEHAVIOURS	Reduce fear and anxiety	Reduce resentment and anger	Reduce depression and stress	Promote bargaining and discovery	Promote understanding and acceptance	CORRELATIONS									
SEATING		**A**	**B**	**C**	**D**	**E**	**ab** to **ak**	**bc** to **bk**	**cd** to **ck**	**de** to **dk**	**ef** to **ek**	**fg** to **fk**	**gh** to **gk**	**hi** to **hk**	**ij** to **ik**	**jk**
Sofa	**a**	12	7	8	3	5										
Padded stools	b	2	3	3	4	5	-0.84									
Metal stools	c	0	1	0	4	2	-0.88	0.68								
Arm chairs	d	10	5	9	2	7	0.85	-0.49	-0.89							
Hard back cha	e	1	2	1	4	3	-0.90	0.77	0.99	-0.87						
Plasic chairs	f	0	0	0	4	1	-0.77	0.51	0.95	-0.81	0.89					
Flat pack seati	g	0	1	0	4	1	-0.81	0.48	0.96	-0.93	0.91	0.97				
Rocking chair	h	6	4	9	1	3	0.70	-0.59	-0.89	0.82	-0.92	-0.76	-0.83			
Single end sofa	i	1	3	2	3	0	-0.28	-0.27	0.28	-0.62	0.18	0.33	0.49	-0.15		
Sream line sea	j	0	1	4	2	4	-0.49	0.69	0.13	0.02	0.19	0.08	-0.02	0.16	-0.30	
Scandinavian s	k	3	1	4	5	3	-0.35	0.24	0.46	-0.19	0.36	0.68	0.49	-0.09	0.03	0.36
CORRE-LATIONS		**AB** to **AE**	0.91	0.88	-0.44	0.70										
		BC to **BE**		0.80	-0.50	0.60										
		CD to **CE**			-0.71	0.71										
		DE				-0.34										

Table 5.20 Correlation Coefficients – No. of Responses - SEATING

The significant 12 difference between minimum Nos. of Responses (0) and maximum No. of Responses (11) indicates that respondents have clearly identified distinct differences between the effects of seating on change behaviours.

The survey score ‘number of responses’ for the A-h (6), B-a (7), C-a (8) and E-d (7) behaviour-material combinations range between 6 and 8 making their probability of being actual relationships greater than 68% but less than 95%, i.e. mean + 1 standard deviation (5.9).

The survey percentage score for the A-a (12), A-d (11), C-d (9) and C-h (9) behaviour-material combinations makes their probability of being actual relationships >95%, i.e. mean + 2 standard deviations (8.7).

There are no significant ‘material choice’ correlations, (i.e. >=0.8), between respondents ‘change management behaviours’ with these correlations being between A & B (0.91) ‘Reduce fear and anxiety’ & ‘Reduce resentment and anger’, A & C (0.88) ‘Reduce fear and anxiety’ & ‘Reduce depression and stress’ and B & C (0.80) ‘Reduce resentment and anger’ & ‘Reduce depression and stress’.

There are significant ‘change management behaviour’ correlations, (i.e. >=0.8), between respondents ‘material choices’, i.e. a & d (0.85), c & e (0.99), c & f (0.95), c & g (0.96), d & h (0.82), e & f (0.89), e & g (0.91) and f & g (0.97).
Examples of high correlations between ‘seating -change management stages’ are shown in Figure 5.11 and Figure 5.12.

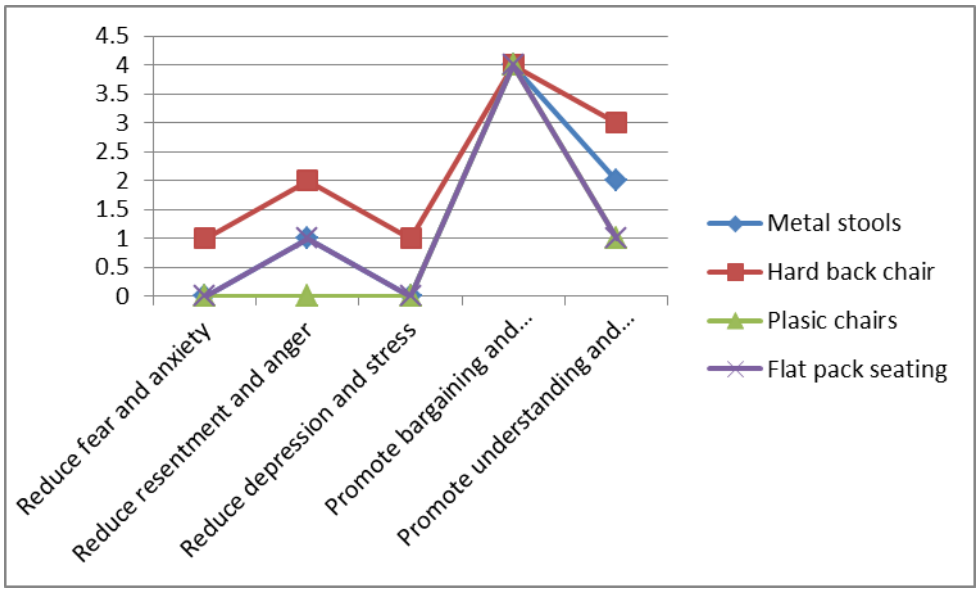

Figure 5.11 Behavioural Correlations of Seating - % Responses

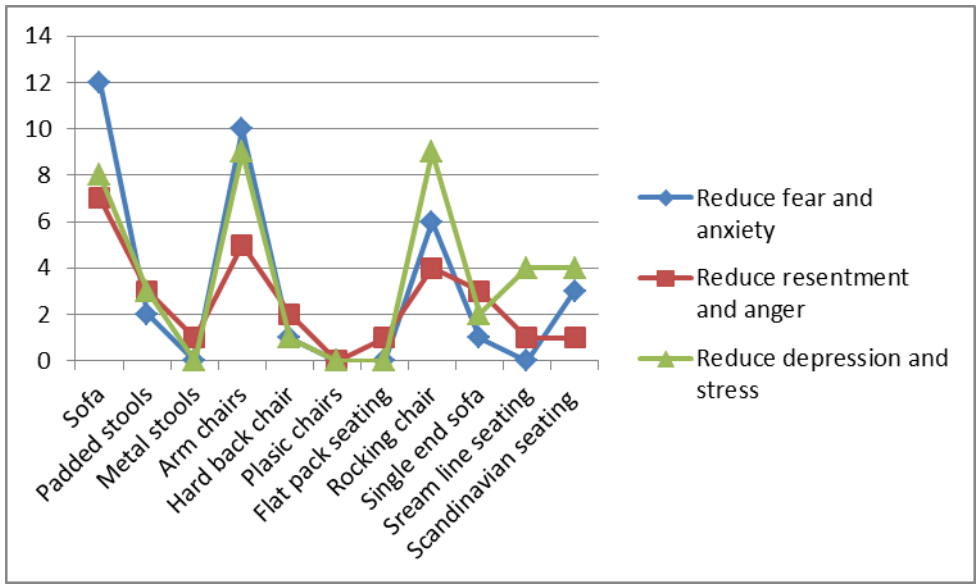

Figure 5.12 Seating Correlations of Behaviours - No. of Responses

5.2.5 Effects of Surface

Survey question 5 asked respondents to provide their opinions on the positive effects of different Surface textures on the emotional behaviours exhibited during the change process, i.e.: (i) reducing fear and anxiety, (ii) reducing resentment and anger, (iii) reducing depression and stress, (iv) promote bargaining and discovery, and (v) promote understanding and acceptance. Accumulated results of the survey are shown in Table 5.21 and Figures 5.13a and 5.13b

	Reduce fear and anxiety	Reduce resentment and anger	Reduce depression and stress	Promote bargaining and discovery	Promote understanding and acceptance	Total Respondents
Matt	73.33% 11	33.33% 5	40% 6	26.67% 4	26.67% 4	30
Gloss	9.09% 1	36.36% 4	36.36% 4	45.45% 5	27.27% 3	17
Shiny	0% 0	20% 2	10% 1	70% 7	0% 0	10
Mirror	0% 0	12.50% 1	0% 0	62.50% 5	37.50% 3	9
Granite	41.67% 5	16.67% 2	33.33% 4	25% 3	25% 3	17
Wood	60% 9	53.33% 8	73.33% 11	40% 6	33.33% 5	39
Acrylic	33.33% 3	11.11% 1	11.11% 1	55.56% 5	11.11% 1	11
Plastic	33.33% 2	0% 0	16.67% 1	50% 3	16.67% 1	7
Aluminium	25% 2	12.50% 1	12.50% 1	50% 4	12.50% 1	9
Metal	0% 0	11.11% 1	22.22% 2	55.56% 5	22.22% 2	10
Slate	41.67% 5	16.67% 2	33.33% 4	50% 6	33.33% 4	21

Table 5.21 Effects of Surface on the Change Management

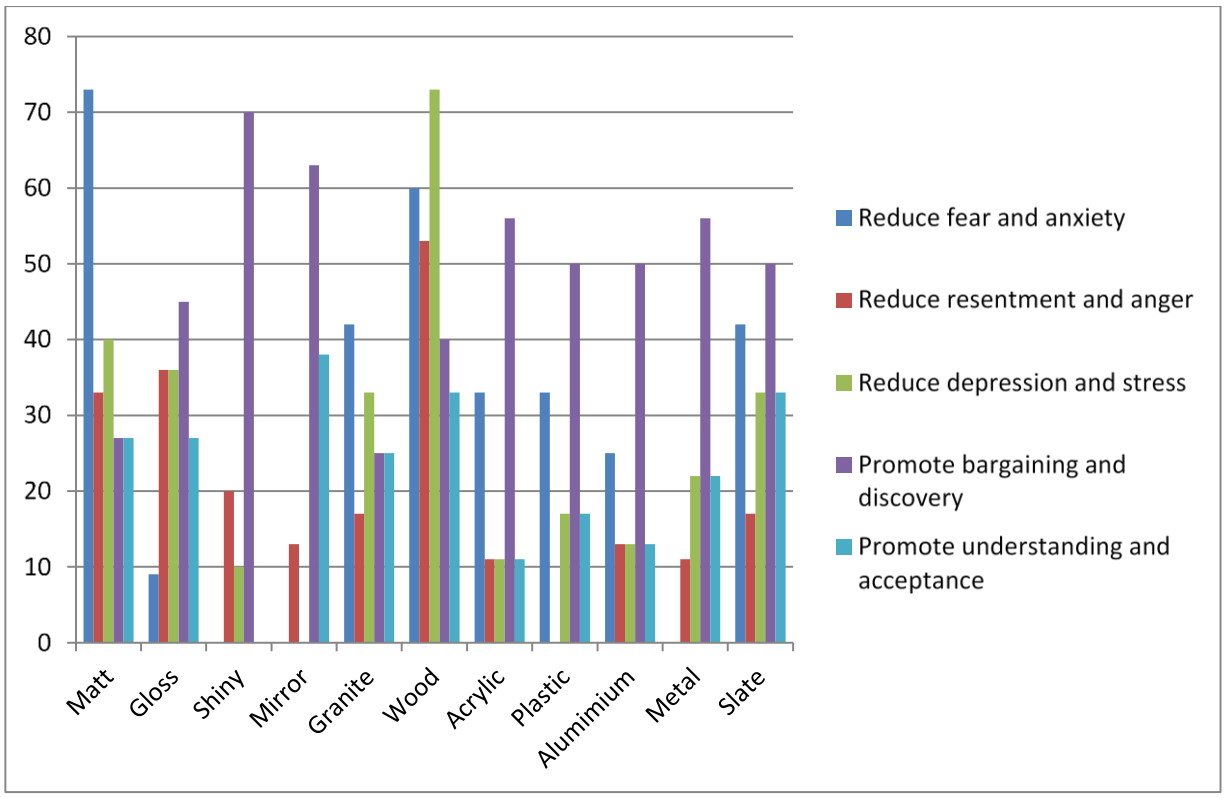

Figure 5.13a: Effect of SURFACE on the change management process
Percentage (%) of Respondents

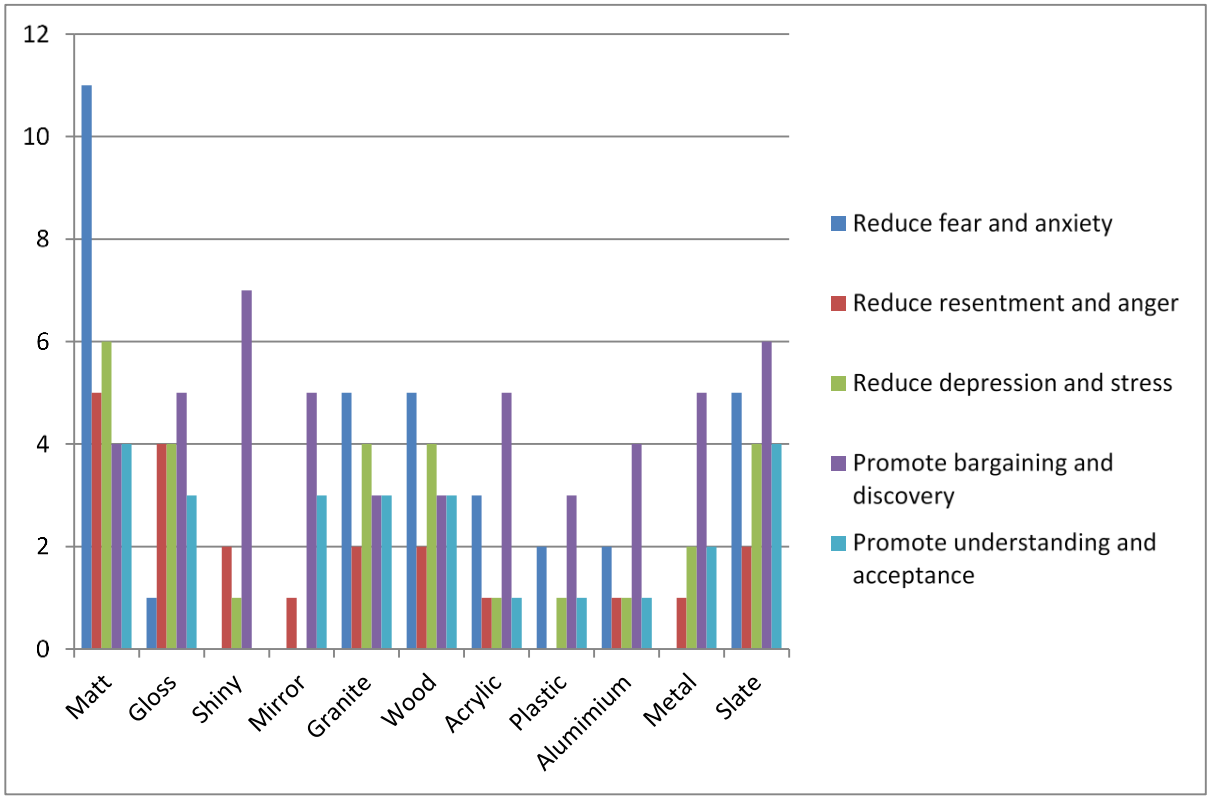

Figure 5.13b: Effect of SURFACE on the change management process
Number of Respondents

5.2.5.1 Results for 'Percentage Responses' - Surface

Using the set of 'percentage quantities', listed in Table 5.21, the statistical information shown in Table 5.22 and Table 5.23 were calculated, i.e.:

Minimum value	**0%**
Maximum value	**73%**
Mean	**29%**
Mode	**33%**
Median	**27%**
Standard Deviation (SD)	**20%**
Correlation coefficients	**Table 5.23**
Mean + SD	**49%**
Mean + (2SD)	**69%**

Table 5.22 Statistical Results - %Responses - SURFACE

	BEHAVIOURS	Reduce fear and anxiety	Reduce resentment and anger	Reduce depression and stress	Promote bargaining and discovery	Promote understanding and acceptance	CORRELATIONS									
							ab to ak	bc to bk	cd to ck	de to dk	ef to ek	fg to fk	gh to gk	hi to hk	ij to ik	jk
SURFACE		**A**	**B**	**C**	**D**	**E**										
Matt	**a**	73	33	40	27	27										
Gloss	b	9	36	36	45	27	-0.85									
Shiny	c	0	20	10	70	0	-0.47	0.74								
Mirror	d	0	13	0	63	38	-0.67	0.56	0.75							
Granite	e	42	17	33	25	25	0.85	-0.71	-0.38	-0.47						
Wood	f	60	53	73	40	33	0.54	-0.18	-0.32	-0.83	0.50					
Acrylic	g	33	11	11	56	11	0.09	0.16	0.77	0.60	0.19	-0.27				
Plastic	h	33	0	17	50	17	0.15	0.04	0.60	0.55	0.42	-0.23	0.93			
Alumimium	i	25	13	13	50	13	-0.07	0.31	0.86	0.69	0.06	-0.33	0.99	0.90		
Metal	j	0	11	22	56	22	-0.68	0.79	0.87	0.86	-0.36	-0.45	0.61	0.60	0.73	
Slate	k	42	17	33	50	33	0.20	-0.05	0.47	0.47	0.53	-0.19	0.84	0.98	0.81	0.54
CORRE-LATIONS		**AB** to **AE**	0.43	0.67	-0.78	0.28										
		BC to **BE**		0.83	-0.41	0.37										
		CD to **CE**			-0.65	0.44										
		DE				-0.40										

Table 5.23 Correlation Coefficients - % Responses - SURFACE

The significant 73% difference between minimum Percentage response (0%) and maximum Percentage response (73%) indicates that respondents have clearly identified distinct differences between the effects of surfaces on change behaviours.

The survey percentage score for the A-f (60%), B-f (53%), D-d (63%), D-g (56%), D-h (50%), D-i (50%), D-j (56%) and D-k (50%) behaviour-surface combinations range

between 48% to 60% making their probability of being actual relationships greater than 68% but less than 95%, i.e. mean + 1 standard deviation (49%).

The survey percentage scores for the A-a (73%), C-f (73%) and D-c (70%) behaviour-surface combinations make their probability of being actual relationships > 95%, i.e. mean + 2 standard deviations (69%).

There are no significant 'surface choice' correlations, (i.e. >=0.8), between respondents 'change management behaviours' with the highest correlation being between B & C, i.e. surfaces selected for reducing 'resentment and anger' and reducing 'depression and stress' where the coefficient of correlation is 0.83.

There are significant 'change management behaviour' correlations, (i.e. >=0.8), between respondents 'surface choices', i.e. a & e (0.85), c & i (0.86), c & j (0.87), d & j (0.86), g & h (0.93), g & i (0.99), g & k (0.84), h &Ki (0.90), h & k (0.98) and i & k (0.81).

5.2.5.2 Results for 'Number of Responses' - Surface

Using the set of 'number of responses', listed in Table 5.21, the statistical information shown in Table 5.24 and Table 5.25 were calculated, i.e.:

Minimum value	**0**
Maximum value	**11**
Mean	**5.1**
Mode	**1**
Median	**3**
Standard Deviation (SD)	**3.0**
Correlation coefficients	**Table 5.25**
Mean + SD	**8.1**
Mean + (2SD)	**11.1**

Table 5.24 Statistical Results – Nos. of Responses - SURFACE

	BEHAVIOURS	Reduce fear and anxiety	Reduce resentment and anger	Reduce depression and stress	Promote bargaining and discovery	Promote understanding and acceptance	CORRELATIONS									
							ab to **ak**	**bc** to **bk**	**cd** to **ck**	**de** to **dk**	**ef** to **ek**	**fg** to **fk**	**gh** to **gk**	**hi** to **hk**	**ij** to **ik**	**jk**
SURFACE		**A**	**B**	**C**	**D**	**E**										
Matt	**a**	11	5	6	4	4										
Gloss	b	1	4	4	5	3	-0.85									
Shiny	c	0	2	1	7	0	-0.47	0.74								
Mirror	d	0	1	0	5	3	-0.67	0.56	0.75							
Granite	e	5	2	4	3	3	0.83	-0.69	-0.38	-0.47						
Wood	f	5	2	4	3	3	0.83	-0.69	-0.38	-0.47	1.00					
Acrylic	g	3	1	1	5	1	0.10	0.15	0.77	0.59	0.20	0.20				
Plastic	h	2	0	1	3	1	0.15	0.03	0.60	0.55	0.42	0.42	0.93			
Alumimium	i	2	1	1	4	1	-0.07	0.30	0.85	0.69	0.07	0.07	0.99	0.91		
Metal	j	0	1	2	5	2	-0.69	0.79	0.87	0.86	-0.35	-0.35	0.60	0.59	0.72	
Slate	k	5	2	4	6	4	0.17	-0.04	0.46	0.48	0.53	0.53	0.83	0.98	0.80	0.54
CORRE-LATIONS		**AB** to **AE**	0.61	0.80	-0.39	0.60										
		BC to **BE**		0.81	0.08	0.58										
		CD to **CE**			-0.25	0.75										
		DE				-0.21										

Table 5.25 Correlation Coefficients – Nos. of Responses - SURFACE

The significant 11 difference between minimum No. of Responses (0) and maximum No. of Responses (11) indicates that respondents have clearly identified distinct differences between the effects of surface on change behaviours.

The survey score ‘number of responses’ for the A-a behaviour-surface combination was 11 range making its probability of being an actual relationships greater than 68%, but less than 95%, i.e. mean + 1 standard deviation (11.1).

All ‘surface choice’ correlations were significant, (i.e. >=0.8), between respondents ‘change management behaviours’ and ranged from 0.96 to 0.99.

There are significant ‘change management behaviour’ correlations, (i.e. >=0.8), between respondents ‘surface choices’, i.e. a & e (0.84), a & f (0.83), c & i (0.85), c & j (0.87), d & j (0.86), e & f (1.00), g & h (0.93), g & i (0.99), g & k (0.83), h & i (0.91), h & k (0.98) and i & k (0.80).

Examples of high correlations between ‘surface-change management stages’ are shown in Figure 5.14 and Figure 5.15.

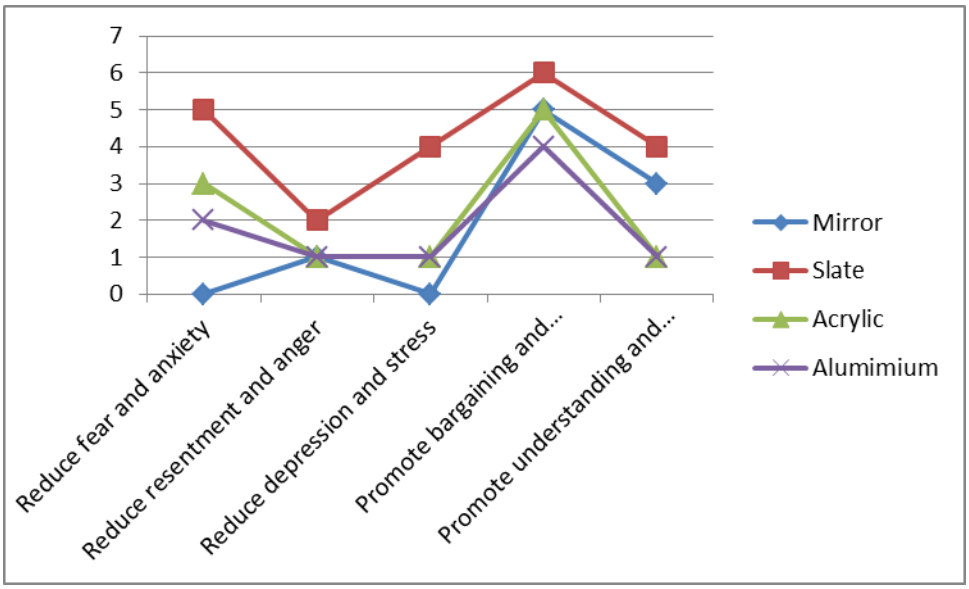

Figure 5.14 Behavioural Correlations of Surfaces – Percentage of Responses

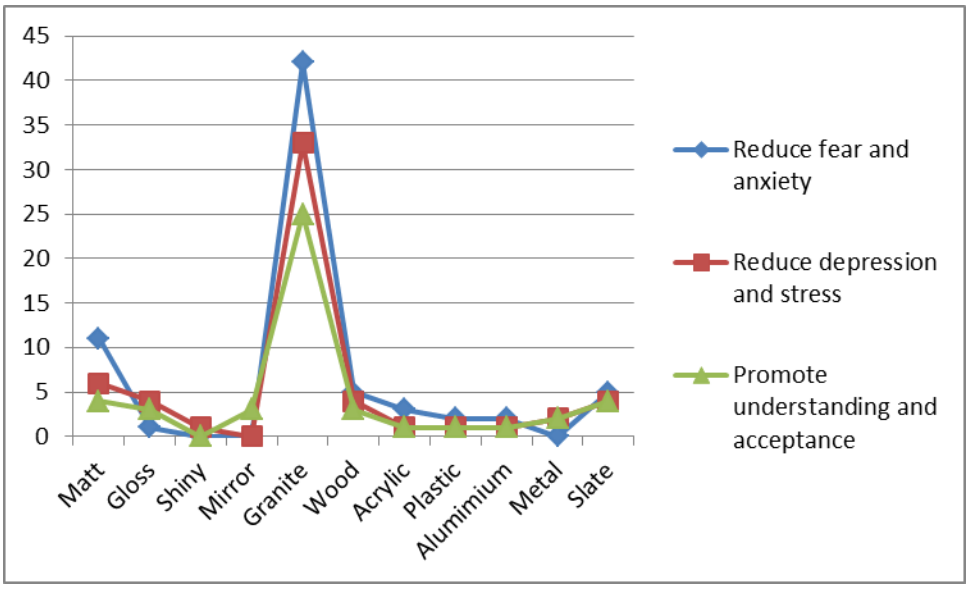

Figure 5.15 Surface Correlations of Behaviours - Nos. of Responses

5.2.6 Effects of Style

Survey question 6 asked respondents to provide their opinions on the positive effects of different furniture styles on the emotional behaviours exhibited during the change process, i.e.: (i) reducing fear and anxiety, (ii) reducing resentment and anger, (iii) reducing depression and stress, (iv) promote bargaining and discovery, and (v) promote understanding and acceptance. Accumulated results of the survey are shown in Table 5.26 and Figures 5.16a and 5.16b.

	Reduce fear and anxiety	Reduce resentment and anger	Reduce depression and stress	Promote bargaining and discovery	Promote understanding and acceptance	Total Respondents
Art Deco	33.33% 4	41.67% 5	50% 6	66.67% 8	25% 3	26
Art Nouveau	0% 0	14.29% 1	14.29% 1	57.14% 4	14.29% 1	7
Arts and Crafts	40% 4	40% 4	30% 3	50% 5	30% 3	19
Victorian	55.56% 5	33.33% 3	11.11% 1	33.33% 3	44.44% 4	16
Edwardian	37.50% 3	37.50% 3	0% 0	12.50% 1	25% 2	9
Georgian	42.86% 3	28.57% 2	14.29% 1	28.57% 2	0% 0	8
Retro (1970's)	25% 2	37.50% 3	37.50% 3	50% 4	25% 2	14
1930's	0% 0	20% 1	0% 0	40% 2	40% 2	5
1950's	0% 0	0% 0	40% 2	40% 2	20% 1	5
1990's	0% 0	16.67% 1	16.67% 1	66.67% 4	33.33% 2	8
Contemporary/Modern	50% 6	25% 3	50% 6	58.33% 7	58.33% 7	29

Table 5.26 Effects of Style on the Change Management Process

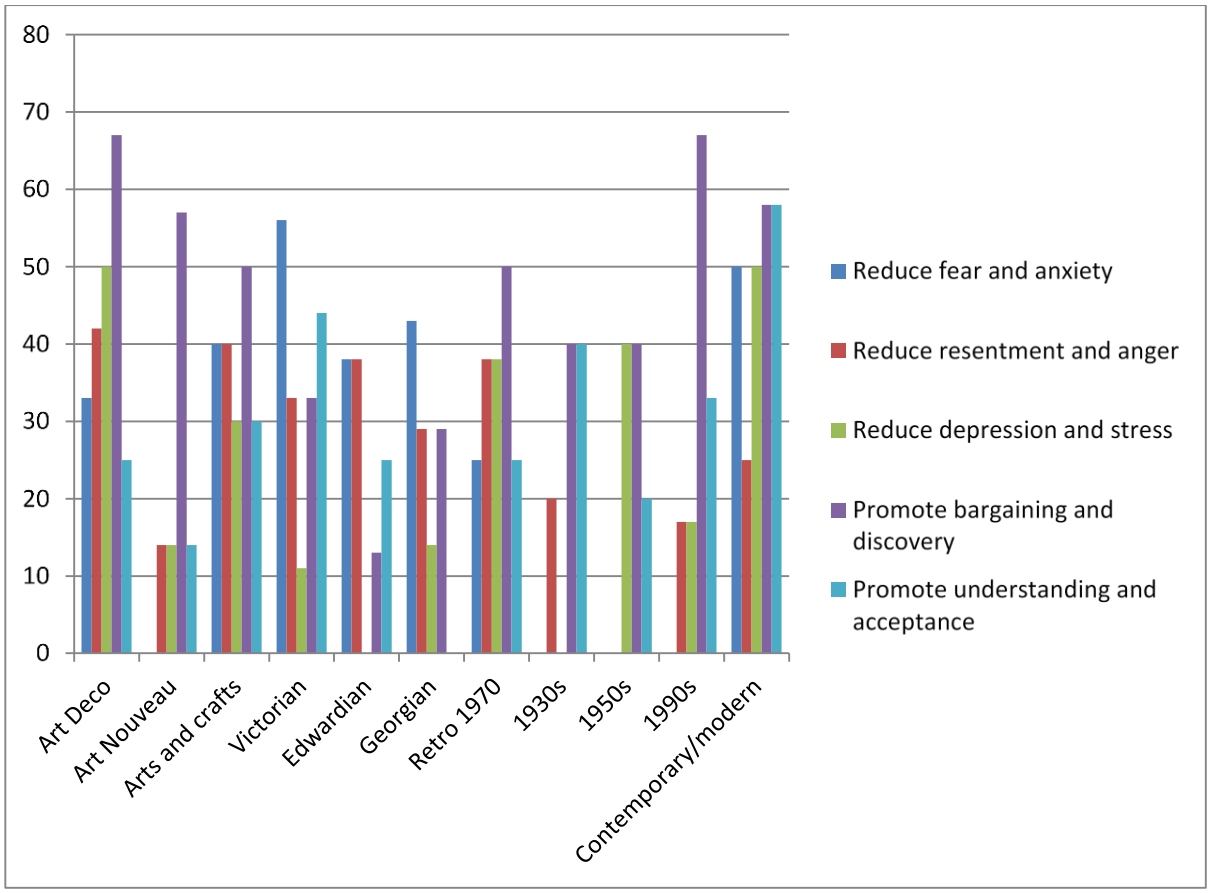

Figure 5.16a: Effect of STYLE on the change management process
Percentage (%) of Respondents

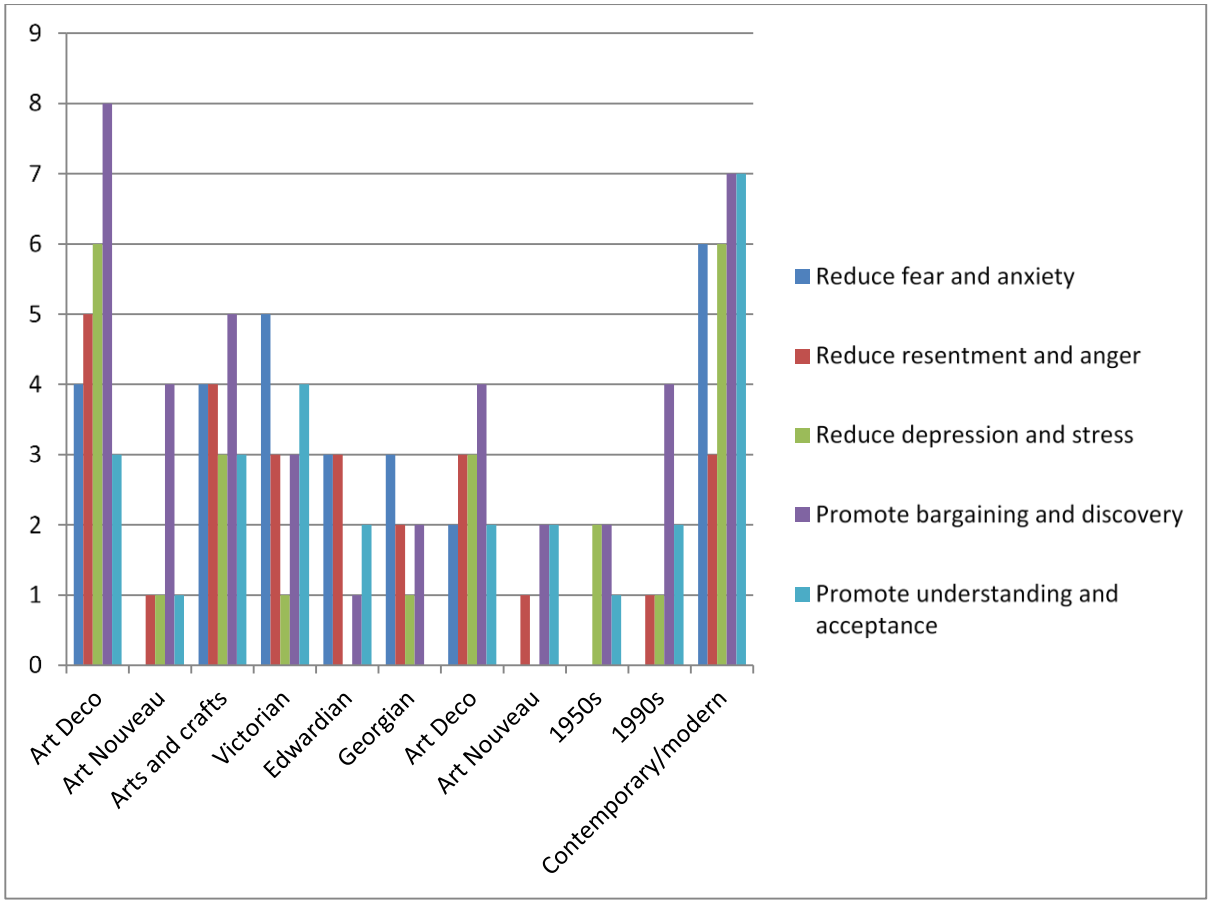

Figure 5.16b: Effect of STYLE on the change management process
Number of Respondents

5.2.6.1 Results for 'Percentage Respondents' - Style

Using the set of 'percentage quantities', listed in Table 5.26, the statistical information shown in Table 5.27 and Table 5.28 were calculated, i.e.:

Minimum value	**0%**
Maximum value	**67%**
Mean	**30%**
Mode	**0%**
Median	**33%**
Standard Deviation (SD)	**19%**
Correlation coefficients	**Table 5.28**
Mean + SD	**49%**
Mean + (2SD)	**67%**

Table 5.27 Statistical Results - %Responses - STYLE

	BEHAVIOURS	Reduce fear and anxiety	Reduce resentment and anger	Reduce depression and stress	Promote bargaining and discovery	Promote understanding and acceptance	CORRELATIONS									
							ab to ak	bc to bk	cd to ck	de to dk	ef to ek	fg to fk	gh to gk	hi to hk	ij to ik	jk
STYLE		**A**	**B**	**C**	**D**	**E**										
Art Deco	**a**	33	42	50	67	25										
Art Nouveau	b	0	14	14	57	14	0.83									
Arts and crafts	c	40	40	30	50	30	0.65	0.67								
Victorian	d	56	33	11	33	44	-0.54	-0.27	0.24							
Edwardian	e	38	38	0	13	25	-0.56	-0.44	0.20	0.80						
Georgian	f	43	29	14	29	0	0.27	-0.02	0.69	0.37	0.45					
Retro 1970	g	25	38	38	50	25	0.96	0.85	0.63	-0.58	-0.50	0.16				
1930s	h	0	20	0	40	40	0.14	0.66	0.30	0.15	0.00	-0.43	0.29			
1950s	i	0	0	40	40	20	0.65	0.66	0.00	-0.68	-0.96	-0.44	0.59	0.25		
1990s	j	0	17	17	67	33	0.65	0.96	0.52	-0.20	-0.43	-0.24	0.70	0.82	0.66	
Contemporary	k	50	25	50	58	58	0.09	0.34	-0.04	0.12	-0.49	-0.32	-0.06	0.29	0.61	0.45
CORRE-LATIONS		**AB** to **AE**	0.71	0.17	-0.30	0.24										
		BC to **BE**		0.06	-0.11	0.08										
		CD to **CE**			0.60	0.18										
		DE				0.23										

Table 5.28 Correlation Coefficients – % Responses - STYLE

The significant 67% difference between minimum percentage response (0%) and maximum percentage response (67%) indicates that respondents have clearly identified distinct differences between the effects of styles on change behaviours.

The survey percentage score for the A-d (56%), A-k (50%), C-a (50%), C-k (50%), D-b (57%), D-c (50%), D-g (50%), D-k (58%) and E-k (58%) behaviour-style combinations range between 48% to 60% making their probability of being actual relationships greater than 68% but less than 95%, i.e. mean + 1 standard deviation (49%).

The survey percentage score for the D-a (67%) and D-j (67%) behaviour-style combinations makes their probability of being an actual relationships 95%, i.e. mean + 2 standard deviations (67%).

There are no significant ‘style choice’ correlations, (i.e. >=0.8), between respondents ‘change management behaviours’ with the highest correlation being between A & B, i.e. styles selected for reducing ‘fear and anxiety’ and reducing ‘resentment and anger’ where the coefficient of correlation is 0.71.

There are significant 'change management behaviour' correlations, (i.e. >=0.8), between respondents 'style choices', i.e. a & b (0.83), a & g (0.96), b & g (0.85), b & k (0.96) d & e (0.80), h & j (0.82).

5.2.6.2 Results for 'Number of Responses' - Style

Using the set of 'number of responses', listed in Table 5.26, the statistical information shown in Table 5.29 and Table 5.30 were calculated, i.e.:

Minimum value	**0**
Maximum value	**8**
Mean	**3**
Mode	**3**
Median	**2**
Standard Deviation (SD)	**2.0**
Correlation coefficients	**Table 5.30**
Mean + SD	**4.7**
Mean + (2SD)	**6.7**

Table 5.29 Statistical Results – No. of Responses - STYLE

	BEHAVIOURS	Reduce fear and anxiety	Reduce resentment and anger	Reduce depression and stress	Promote bargaining and discovery	Promote understanding and acceptance	CORRELATIONS									
							ab to **ak**	**bc** to **bk**	**cd** to **ck**	**de** to **dk**	**ef** to **ek**	**fg** to **fk**	**gh** to **gk**	**hi** to **hk**	**ij** to **ik**	**jk**
STYLE		**A**	**B**	**C**	**D**	**E**										
Art Deco	**a**	4	5	6	8	3										
Art Nouveau	b	0	1	1	4	1	0.82									
Arts and crafts	c	4	4	3	5	3	0.65	0.67								
Victorian	d	5	3	1	3	4	-0.54	-0.27	0.24							
Edwardian	e	3	3	0	1	2	-0.58	-0.46	0.18	0.80						
Georgian	f	3	2	1	2	0	0.27	-0.03	0.68	0.35	0.44					
Retro 1970	g	2	3	3	4	2	0.96	0.87	0.64	-0.56	-0.50	0.16				
1930s	h	0	1	0	2	2	0.13	0.66	0.30	0.17	0.00	-0.44	0.30			
1950s	i	0	0	2	2	1	0.65	0.66	0.00	-0.67	-0.96	-0.44	0.60	0.25		
1990s	j	0	1	1	4	2	0.63	0.96	0.51	-0.18	-0.43	-0.26	0.71	0.82	0.66	
Contemporary	k	6	3	6	7	7	0.09	0.34	-0.04	0.12	-0.49	-0.32	-0.04	0.30	0.61	0.46
CORRE-LATIONS		**AB** to **AE**	0.79	0.57	0.48	0.72										
		BC to **BE**		0.60	0.60	0.47										
		CD to **CE**			0.91	0.63										
		DE				0.61										

Table 5.30 Correlation Coefficients – No. of Responses - STYLE

The 8 difference between minimum Nos. of Responses (0) and maximum Nos. of Responses (8) indicates that respondents may not have clearly identified distinct differences between the effects of materials on change behaviours. The survey score ‘number of responses’ for the A-d (5), A-k (6), B-a (5), C-a (6), C-k (6) and D-c (5) behaviour-style combinations make their probability of being actual relationships greater than 68% but less than 95%, i.e. mean + 1 standard deviation (4.7).

The survey percentage score for the D-a (8), D-k (7) and E-k (7) behaviour-style combinations makes their probability of being actual relationships >95%, i.e. mean + 2 standard deviations (6.7).

There is one significant ‘style choice’ correlations, (i.e. >=0.8), between respondents ‘change management behaviours’ which is between C & D, i.e. styles selected for reducing ‘depression and stress’ and promoting ‘bargaining and discovery’ where the coefficient of correlation is 0.91.

There are significant ‘change management behaviour’ correlations, (i.e. >=0.8), between respondents ‘style choices’, i.e. a & b (0.82), a & g (0.96), b & g (0.87), b & j (0.96), d & e (0.80), h & j (0.82).

Examples of high correlations between ‘colour-change management stages’ are shown in Figure 5.17 and Figure 5.18.

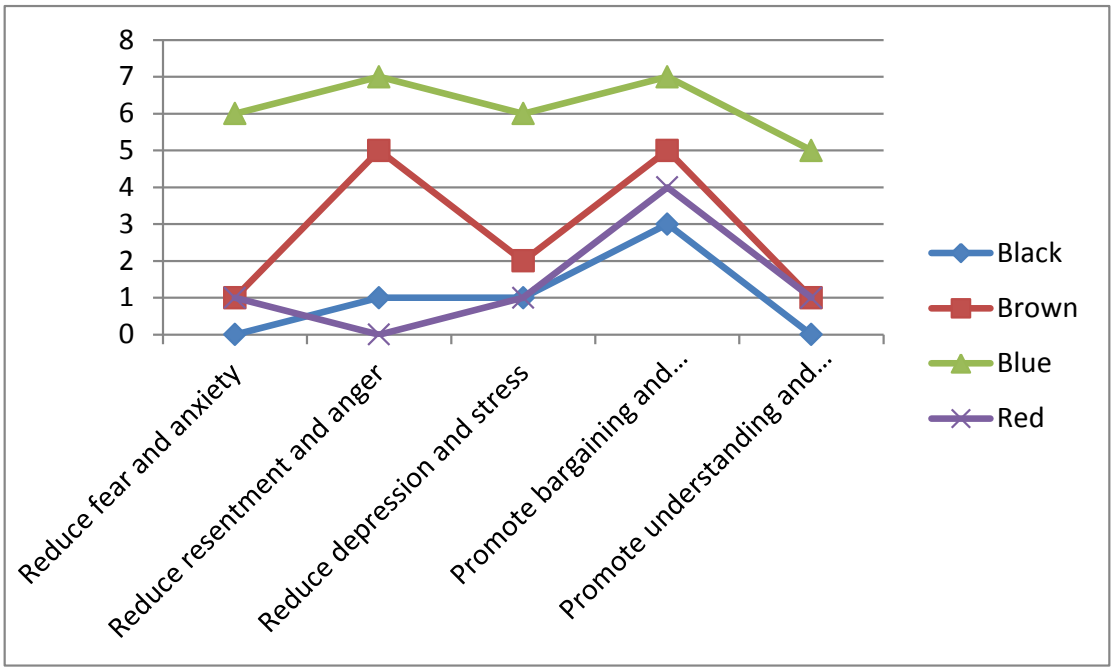

Figure 5.17 Behavioural Correlations of Colour – No. of Responses

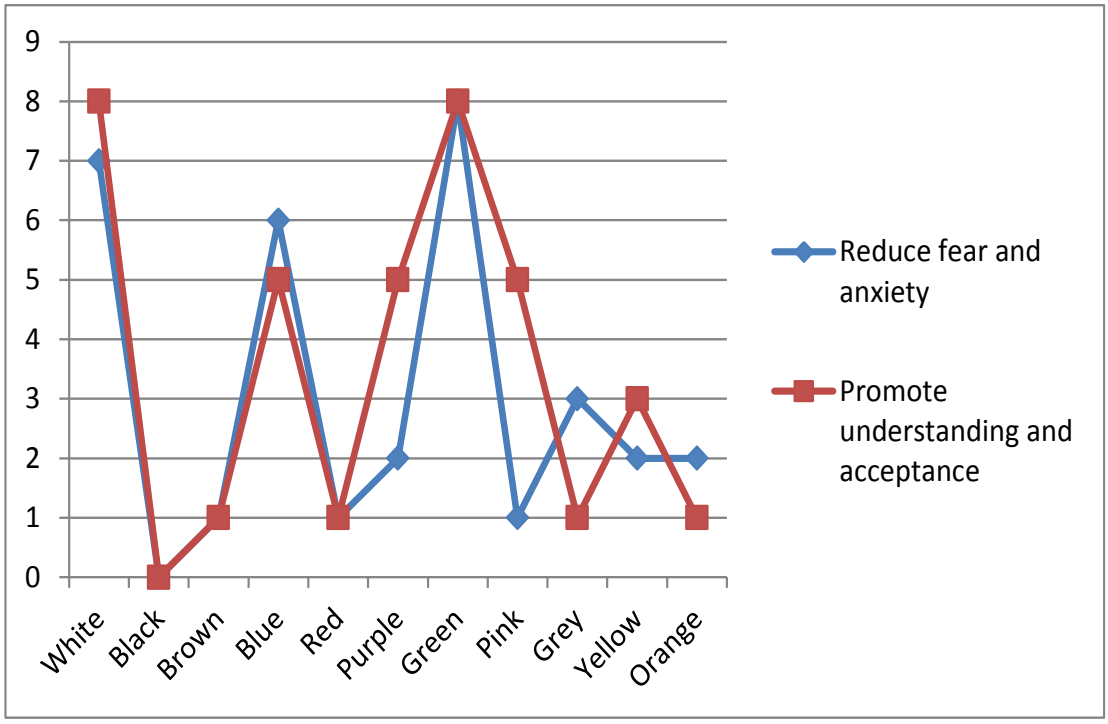

Figure 5.18 Colour Correlations of Behaviours - No. of Responses

5.2.7 Interior Design Components with Greatest Positive Effects on Change Behaviours

Survey question 7 asked respondents to provide their opinions on interior design components and their relative 'positive' effects on the emotional behaviours exhibited during the change process, i.e.: (i) reducing fear and anxiety, (ii) reducing resentment and anger, (iii) reducing depression and stress, (iv) promote bargaining and discovery, and (v) promote understanding and acceptance. Accumulated results of the survey are shown in Table 5.31.

	Reduce fear and anxiety	Reduce resentment and anger	Reduce depression and stress	Promote bargaining and discovery	Promote understanding and acceptance	Total	Average Rating
COLOUR	41.18% 7	5.88% 1	41.18% 7	5.88% 1	5.88% 1	17	1.00
SHAPE	18.75% 3	12.50% 2	6.25% 1	50% 8	12.50% 2	16	1.00
MATERIAL	28.57% 4	14.29% 2	21.43% 3	35.71% 5	0% 0	14	1.00
SEATING	23.53% 4	29.41% 5	17.65% 3	17.65% 3	11.76% 2	17	1.00
SURFACE	20% 3	13.33% 2	20% 3	33.33% 5	13.33% 2	15	1.00
STYLE	37.50% 6	6.25% 1	6.25% 1	0% 0	50% 8	16	1.00

Table 5.31 Greatest Positive Effects on Change Management Process

5.2.7.1 Results for 'Percentage Responses' - Greatest Positive Effects

Using the set of 'percentage quantities', listed in Table 5.31, the statistical information shown in Table 5.32 and Table 5.33 were calculated, i.e.:

Minimum value	**0%**
Maximum value	**50%**
Mean	**20.0%**
Mode	**6%**
Median	**18%**
Standard Deviation (SD)	**14.3%**
Correlation coefficients	**Table 5.33**
Mean + SD	**34.3%**
Mean + (2SD)	**48.5%**

Table 5.32 Statistical Results - %Responses

	BEHAVIOURS	Reduce fear and anxiety	Reduce resentment and anger	Reduce depression and stress	Promote bargaining and discovery	Promote understanding and acceptance	CORRELATIONS				
							ab to **af**	**bc** to **bf**	**cd** to **cf**	**de** to **df**	**ef**
COLOURS		**A**	**B**	**C**	**D**	**E**					
Colour	**a**	41	6	41	6	6					
Shape	b	19	13	6	50	13	-0.41				
Material	c	29	14	21	36	0	0.33	0.66			
Seating	d	24	29	18	18	12	0.11	-0.10	0.30		
Surface	e	20	13	20	33	13	0.02	0.86	0.86	-0.15	
Style	f	38	6	6	0	50	0.08	-0.34	-0.55	-0.39	-0.51
CORRE-LATIONS		**AB** to **AE**	-0.58	0.46	-0.84	0.32					
		BC to **BE**		-0.14	0.26	-0.33					
		CD to **CE**			-0.31	-0.58					
		DE				-0.54					

Table 5.33 Correlation Coefficients – % Responses – GREATEST POSITIVE EFFECTS

The significant 50% difference between minimum percentage of response (0%) and maximum percentage of response (50%) indicates that respondents have clearly identified distinct differences between the relative sizes of the positive effects of interior design components on change behaviours.

The survey percentage score for the A-a (41%), A-f (38%), C-a (41%) and D-c (36%), behaviour-interior design component combinations make their probability of being actual relationships greater than 68% but less than 95%, i.e. mean + 1 standard deviation (34%).

The survey percentage score for the D-b (50%) and E-f (50%) behaviour-greatest effect component combinations makes their probability of being an actual relationships 95%, i.e. mean + 2 standard deviations 48.5%).

There are no significant ‘greatest effect component choice’ correlations, (i.e. >=0.8), between respondents ‘change management behaviours’ with the highest correlation being between A & C, i.e. greatest positive effect components selected for reducing ‘fear and anxiety’ and reducing ‘depression and stress’ where the coefficient of correlation is 0.46.

There are significant 'change management behaviour' correlations, (i.e. >=0.8), between respondents 'greatest relative effects' choices', i.e. b & e (0.83) and c & e (0.96).

5.2.7.2 Results for 'Number of Responses' – Greatest Positive Effects

Using the set of 'number of responses', listed in Table 5.31, the statistical information shown in Table 5.34 and Table 5.35 were calculated, i.e.:

Minimum value	**0**
Maximum value	**8**
Mean	**3.2**
Mode	**1**
Median	**3**
Standard Deviation (SD)	**2.3**
Correlation coefficients	**Table 5.3**
Mean + SD	**5.5**
Mean + (2SD)	**7.7**

Table 5.34 Statistical Results – No. of Responses

GREATEST POSITIVE EFFECTS

	BEHAVIOURS	Reduce fear and anxiety	Reduce resentment and anger	Reduce depression and stress	Promote bargaining and discovery	Promote understanding and acceptance	CORRELATIONS				
							ab to **af**	**bc** to **bf**	**cd** to **cf**	**de** to **df**	**ef**
COLOURS		**A**	**B**	**C**	**D**	**E**					
Colour	**a**	7	1	7	1	1					
Shape	b	3	2	1	8	2	-0.39				
Material	c	4	2	3	5	0	0.33	0.67			
Seating	d	4	5	3	3	2	0.08	-0.11	0.27		
Surface	e	3	2	3	5	2	0.00	0.88	0.85	-0.18	
Style	f	6	1	1	0	8	0.08	-0.36	-0.58	-0.39	-0.52
CORRE-LATIONS		**AB** to **AE**	-0.45	0.56	-0.87	0.32					
		BC to **BE**		-0.12	0.20	-0.27					
		CD to **CE**			-0.37	-0.52					
		DE				-0.53					

Table 5.35 Correlation Coefficients – No. of Responses

GREATEST POSITIVE EFFECTS

The 8 difference between minimum No. of Responses (0) and maximum Nos. of Responses (8) indicates that respondents may not have clearly identified distinct differences between the effects of colour on change behaviours

The survey score ‘number of responses’ for the A-a (7), A-f (6) and C-a (7) behaviour-greatest positive effect component combinations make their probability of being actual relationships greater than 68% but less than 95%, i.e. mean + 1 standard deviation (5.5).

The survey percentage score for the D-b (8) and E-f (8) behaviour-greatest positive effect component combinations makes their probability of being actual relationships >95%, i.e. mean + 2 standard deviations (7.7).

There is one significant ‘greatest positive effect component choice’ correlations, (i.e. >=0.8), between respondents ‘change management behaviours’ which is between A & C, i.e. greatest positive effect components selected for reducing ‘fear and anxiety‘ and reducing ‘depression and stress’ where the coefficient of correlation is 0.56.

There are significant ‘change management behaviour’ correlations, (i.e. >=0.8), between respondents ‘greatest positive effect component choices’, i.e. b & e (0.88) and c & e (0.85).

Example of correlation between ‘greatest positive effect component-change management stages’ is shown in Figure 5.19 and Figure 5.20.

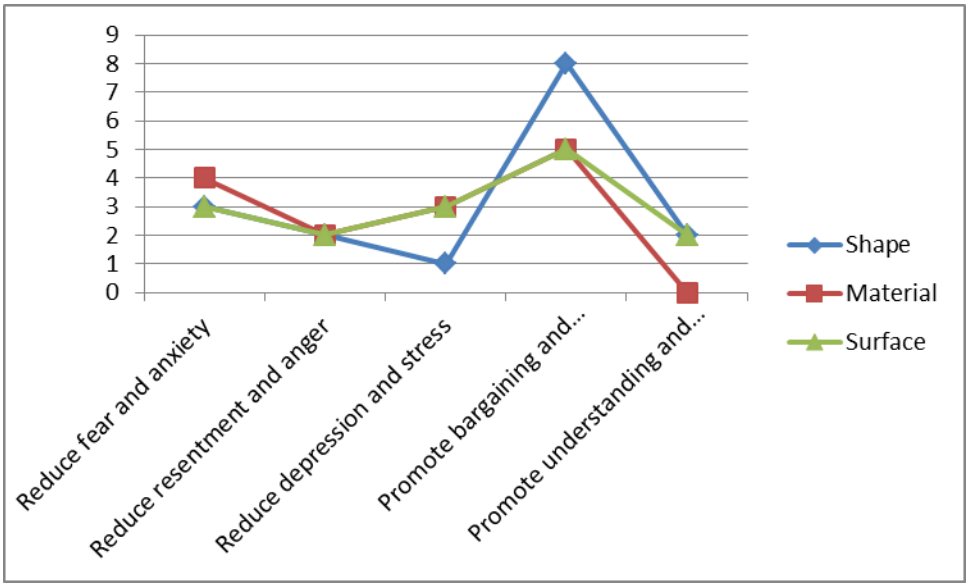

Figure 5.19 Behavioural Correlations of Greatest Positive Effect Components – Nos. of Responses

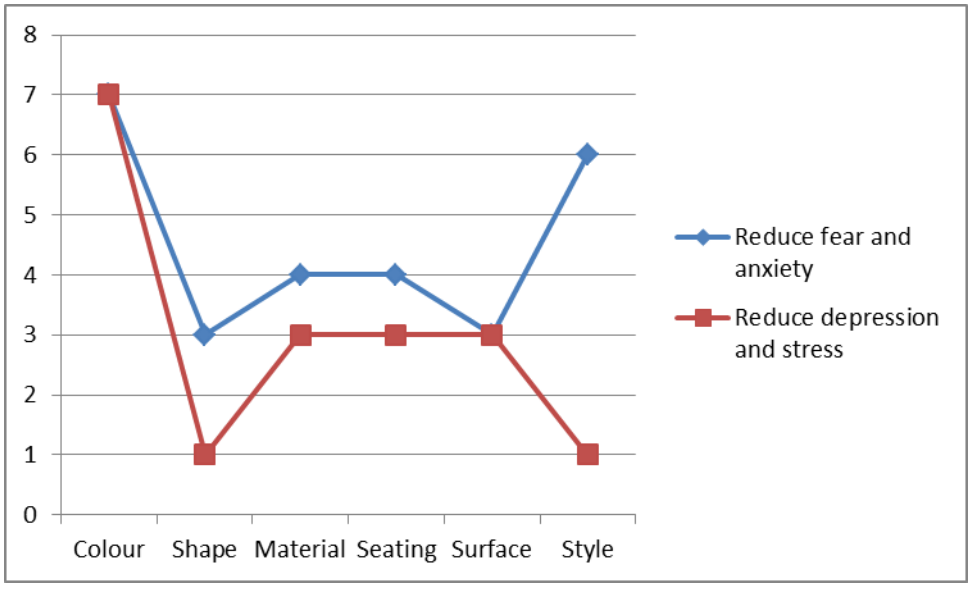

Figure 5.20 Greatest Positive Effect Components Correlations of Behaviours - Nos. of Responses

5.2.8 Interior Design Components with Greatest Negative Effects on Change Behaviours

Survey question 8 asked respondents to provide their opinions on interior design components and their relative 'negative' effects on the emotional behaviours

exhibited during the change process, i.e.: (i) reducing fear and anxiety, (ii) reducing resentment and anger, (iii) reducing depression and stress, (iv) promote bargaining and discovery, and (v) promote understanding and acceptance.

Accumulated results of the survey are shown in Table 5.36.

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	Reduce fear and anxiety	Reduce resentment and anger	Reduce depression and stress	Promote bargaining and discovery	Promote understanding and acceptance	Total	Average Rating
COLOUR	31.25% 5	12.50% 2	31.25% 5	18.75% 3	6.25% 1	16	1.00
SHAPE	53.33% 8	33.33% 5	13.33% 2	0% 0	0% 0	15	1.00
MATERIAL	33.33% 5	13.33% 2	40% 6	13.33% 2	0% 0	15	1.00
SEATING	12.50% 2	12.50% 2	18.75% 3	31.25% 5	25% 4	16	1.00
SURFACE	31.25% 5	6.25% 1	6.25% 1	18.75% 3	37.50% 6	16	1.00
STYLE	33.33% 5	13.33% 2	6.67% 1	26.67% 4	20% 3	15	1.00

Table 5.36 Greatest Negative Effects on Change Management Process

5.2.8.1 Results for 'Percentage Responses' - Greatest Negative Effects

Using the set of 'percentage quantities', listed in Table 5.36, the statistical information shown in Table 5.37 and Table 5.38 were calculated, i.e.:

Minimum value	**0%**
Maximum value	**53%**
Mean	**20.0%**
Mode	**13%**
Median	**19%**
Standard Deviation (SD)	**13.4%**
Correlation coefficients	**Table 5.38**
Mean + SD	**33%**
Mean + (2SD)	**47%**

Table 5.37 Statistical Results - %Responses

GREATEST NEGATIVE EFFECTS

	BEHAVIOURS	Reduce fear and anxiety	Reduce resentment and anger	Reduce depression and stress	Promote bargaining and discovery	Promote understanding and acceptance	CORRELATIONS				
							ab to **ak**	**bc** to **bk**	**cd** to **ck**	**de** to **dk**	**ef** to **ek**
COLOURS		**A**	**B**	**C**	**D**	**E**					
Colour	**a**	31	13	31	19	6					
Shape	b	53	33	13	0	0	0.49				
Material	c	33	13	40	13	0	0.97	0.49			
Seating	d	13	13	19	31	25	-0.35	-0.88	-0.47		
Surface	e	31	6	6	19	38	-0.29	-0.05	-0.41	0.25	
Style	f	33	13	7	27	20	0.09	0.30	-0.13	0.15	0.69
CORRE-LATIONS		**AB** to **AE**	0.73	-0.13	-0.90	-0.54					
		BC to **BE**		-0.05	-0.73	-0.65					
		CD to **CE**			-0.14	-0.66					
		DE				0.63					

Table 5.38 Correlation Coefficients – % Responses – GREATEST NEGATIVE EFFECTS

The significant 53% difference between minimum percentage response (0%) and maximum percentage response (53%) indicates that respondents have clearly identified distinct differences between the relative sizes of the negative effects of interior design components on change behaviours.

The survey percentage score for the A-c (33%), A-f (33%), B-b (33%), C-c (40%) and E-e (38%), behaviour-interior design component combinations make their probability of being actual relationships greater than 68% but less than 95%, i.e. mean + 1 standard deviation (33%).

The survey percentage score for the A-b (53%) behaviour-greatest negative effect component combination makes its probability of being an actual relationships 95%, i.e. mean + 2 standard deviations (47%).

There are no significant ‘greatest negative effect component choice’ correlations, (i.e. >=0.8), between respondents ‘change management behaviours’ with the highest correlation being between A & B, i.e. greatest negative effect components selected for reducing ‘fear and anxiety’ and reducing ‘resentment and anger’ where the coefficient of correlation is 0.73.

There is one significant 'change management behaviour' correlation, (i.e. >=0.8), between respondents 'greatest negative effects' choices', i.e. a & c (0.97).

5.2.8.2 Results for 'Number of Responses' – Greatest Negative Effects

Using the set of 'number of responses', listed in Table 5.36, the statistical information shown in Table 5.39 and Table 5.40 were calculated, i.e.:

Minimum value	**0**
Maximum value	**8**
Mean	**3.1**
Mode	**5**
Median	**3**
Standard Deviation (SD)	**2.1**
Correlation coefficients	**Table 5.43**
Mean + SD	**5**
Mean + (2SD)	**7**

Table 5.39 Statistical Results – No. of Responses

GREATEST NEGATIVE EFFECTS

	BEHAVIOURS	Reduce fear and anxiety	Reduce resentment and anger	Reduce depression and stress	Promote bargaining and discovery	Promote understanding and acceptance	CORRELATIONS				
							ab to **ak**	**bc** to **bk**	**cd** to **ck**	**de** to **dk**	**ef** to **ek**
COLOURS		**A**	**B**	**C**	**D**	**E**					
Colour	**a**	5	2	5	3	1					
Shape	b	8	5	2	0	0	0.48				
Material	c	5	2	6	2	0	0.97	0.50			
Seating	d	2	2	3	5	4	-0.34	-0.89	-0.47		
Surface	e	5	1	1	3	6	-0.26	-0.03	-0.40	0.24	
Style	f	5	2	1	4	3	0.09	0.32	-0.13	0.12	0.69
CORRE-LATIONS		**AB** to **AE**	0.69	-0.15	-0.92	-0.52					
		BC to **BE**		-0.07	-0.74	-0.64					
		CD to **CE**			-0.11	-0.63					
		DE				0.64					

Table 5.40 Correlation Coefficients – No. of Responses

GREATEST NEGATIVE EFFECTS

The 8 difference between minimum No. of Responses (0) and maximum No. of Responses (8) indicates that respondents may not have clearly identified distinct differences between the negative effects of interior design components on change behaviours

The survey score ‘number of responses’ for the A-a (5), A-c (5), A-e (5), A-f (5), B-b (5), C-a (7), C-c (6), D-d (5) and E-e (6) behaviour-greatest negative effect component combinations make their probability of being actual relationships greater than 68% but less than 95%, i.e. mean + 1 standard deviation (5).

The survey percentage score for the A-b (8) behaviour-greatest negative effect component combination makes its probability of being an actual relationship >95%, i.e. mean + 2 standard deviations (7).

There are no significant ‘greatest positive effect component choice’ correlations, (i.e. >=0.8), between respondents ‘change management behaviours’ the greatest being between A & B, i.e. greatest negative effect components selected for reducing ‘fear and anxiety‘ and reducing ‘resentment and anger’ where the coefficient of correlation is 0.69.

There is one significant ‘change management behaviour’ correlations (i.e. >=0.8), between respondents ‘greatest negative effect component choices’, i.e. a & c (0.97).

Example of correlations between ‘greatest negative effect component-change management stages’ is shown in Figure 5.21 and Figure 5.22.

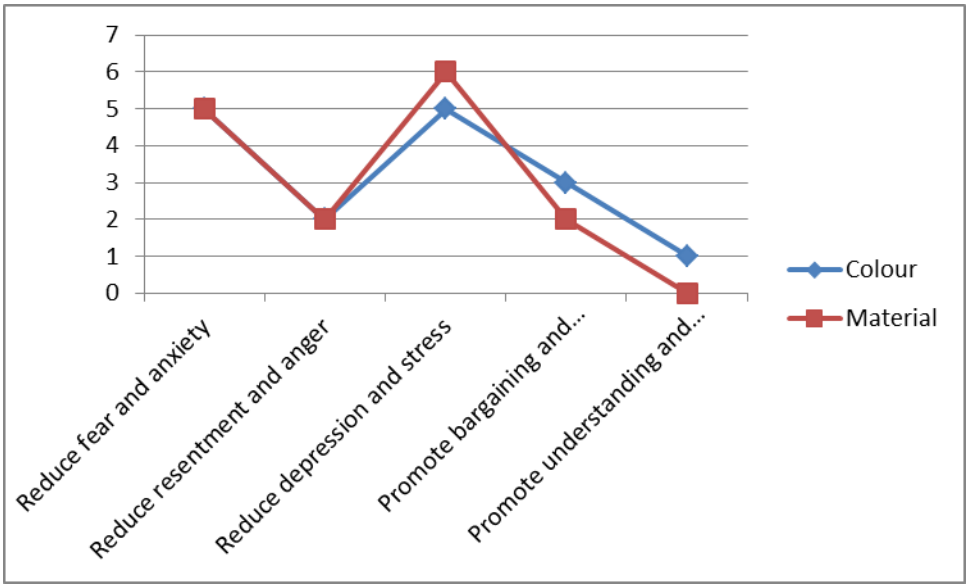

Figure 5.21 Behavioural Correlations of Greatest Negative Effect Components – Nos. of Responses

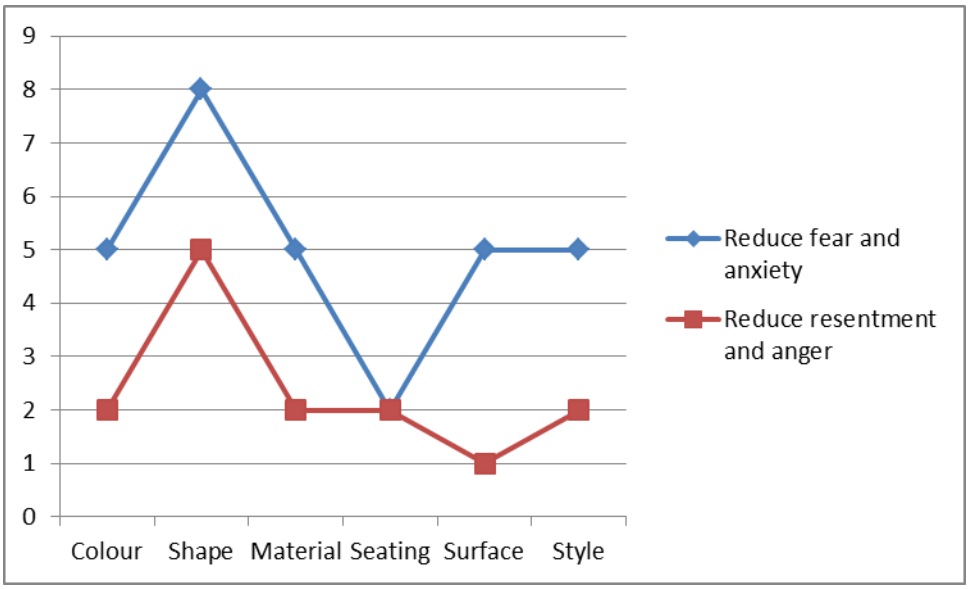

Figure 5.22 Greatest Negative Effect Components Correlations Of Behaviours - Nos. of Responses

5.3 Development of the Interior Design Component Characteristic Selection Tool (IDCCST)

The following steps were undertaken to develop the Change Management Interior Design Selector Tool, i.e.:

1. The ‘Survey Behaviour’ worksheet was developed as follows:

    i. For each interior design component, i.e. Colour, Shape, Material, Seating, Surface and Style, the ‘top two’ most frequently selected ‘characteristics’ identified in Section 2 were selected for use by the selector tool.
    ii. A matrix was developed with each Interior Design Component-Component Characteristic combination representing individual matrix Rows and the Change Management Work Place interior areas they acted on representing matrix Columns.
    iii. In each Column-Row cell the respective ‘Change Management Emotion’ that the ‘Row interior design component characteristic’ influence was entered.
    iv. Where interior design components were not relevant to specific work place interior areas the respective Matrix cells remained blank.

2. ID Selector worksheet was developed as follows:

    i. A matrix was developed with each Interior Design Component representing individual matrix Rows and the Change Management Work Place interior areas representing individual matrix Columns.
    ii. Additional columns were inserted immediately before each of the above Work Place interior column and the Change Management Behaviours entered into them such that for each Interior Design Component Characteristic had two entries, one for each of the ‘top two’ interior design component characteristics used in the ID Selector works sheet..

iii. The Data-Data Validation-List tool was then used to enable individual Change Management Emotions to be selected from a pull-down list of all 5 emotions.

iv. Each time the Change Management Emotion selected from the pull-down list corresponded with the Change Management Emotion entered into an individual Column-Row cell in the 'Survey Behaviours' worksheet the respective Interior Design Component-Component Characteristic form the ID Selector worksheet would be copied into the corresponding Column-Row cell.

3. To use the selector tool the user needs only to select the change management behaviour that needs to be addressed and the tool automatically selects the appropriate interior design component characteristics.

5.4 Comparison between literature review and questionnaire-survey 'emotional behaviour - interior design characteristic' relationships

Change management models consist of two types of emotional responses, i.e. (i) dysfunctional responses which are detrimental to the change management process and (ii) functional responses which assist the change management process. In essence the challenge for change managers is to convert 'dysfunctional responses' into 'functional responses' the change process proceeds through its various stages.

This research has grouped the range of emotional responses emerging during the change process into 5 groups, i.e. (1) fear and anxiety, (2) resentment and anger, (3) depression and stress, (4) bargaining and discovery, and (5) understanding and acceptance. Emotional responses 1 to 3 are 'dysfunctional' and emotional responses 4 and 5 'functional'.

This research, has then attempted to identify the interior design component characteristics that 'reduce' dysfunctional responses and 'promote' functional responses. Both, the literature review and survey questionnaire have aimed to identify those interior design component characteristics that 'reduced the levels of dysfunctional emotional responses that arose' and 'promote the levels of functional emotional responses that arose' during the change process, i.e. the 5 groups were

labelled (1) Reduce fear and anxiety, (2) Reduce resentment and anger, (3) Reduce depression and stress, (4) Promote bargaining and discovery, and (5) Promote understanding and acceptance

The Interior Design Component Characteristic Selection Tool (IDCCST) makes use of only the Interior Design (ID) component characteristics that received the highest number of responses from the survey. For each of these characteristics qualitative comparisons were made between their emotional response relationships identified through the literature review with those identified through the survey questionnaire.

These comparisons used a simple marking scheme to determine the level of similarity between literature review and survey questionnaire component characteristic-emotional response relationship, i.e. if no similarity existed then the relationship was allocated a zero score; a value of was 1 allocated if a level of similarity existed and a value of 2 if the review results were fully compatible with the survey results. The results of these comparisons are shown in Table 5.41. These results indicated that 50 out of the total of 63 comparisons had an acceptable level of similarity between the literature review and the survey questionnaire results, i.e. 79%.

Table 5.41: Comparisons of Literature Review and Survey Questionnaire Change Management Emotional Responses of ID Component Characteristics

Comparisons with no similarity (Score: 0) Total number of comparisons 13

Colour - Blue - Reduce resentment and anger
Shape - Round or Curved - Reduce fear and anxiety
Shape - Semicircle or Curved - Reduce resentment and anger
Shape - Semicircle - Reduce depression and stress
Surface - Granite, Wood or Slate - Reduce fear and anxiety
Surface - Gloss - Reduce resentment and anger
Surface - Matt or Slate - Promote understanding and acceptance
Surface - Gloss, Mirror, Granite or Wood - Promote understanding and acceptance
Style - Art Deco - Reduce resentment and anger
Style - Art Deco or Contemporary - Reduce depression and stress
Style - Arts & Crafts or Retro 1970s - Reduce depression and stress
Great Positive effect - Surface - Reduce fear and anxiety
Great Negative effect - Surface - Reduce fear and anxiety

Comparisons with acceptable level of similarity (Score: 1) Total number of comparisons 29

Colour - White - Reduce fear and anxiety
Colour - Green - Reduce depression and stress
Colour - Blue - Promote bargaining and discovery
Colour - Green - Promote understanding and acceptance
Shape - Circle - Reduce fear and anxiety
Shape - Curved - Reduce resentment and anger
Shape - Curved or Circle - Reduce depression and stress
Shape - Curved - Promote bargaining and discovery
Shape - Triangular or Circle - Promote bargaining and discovery
Shape - Circle - Promote understanding and acceptance
Material - Upholstery Fabric - Reduce fear and anxiety
Material - Wood - Reduce resentment and anger
Material - Soft Furnishing - Reduce resentment and anger
Material - Wood - Promote understanding and acceptance
Surface - Matt - Reduce fear and anxiety
Surface - Matt - Reduce resentment and anger
Surface - Matt - Reduce depression and stress
Surface - Gloss, Granite, Wood or Slate - Reduce depression and stress
Surface - Shiny - Promote bargaining and discovery
Surface - Slate - Promote bargaining and discovery
Style - Victorian - Reduce fear and anxiety
Style - Arts and Crafts - Reduce resentment and anger
Style - Art Deco - Promote bargaining and discovery
Style - Victorian - Promote understanding and acceptance
Great positive effect - Seating - Reduce fear and anxiety
Great positive effect - Style - Reduce fear and anxiety
Great negative effect - Material - Reduce fear and anxiety
Great negative effect - Surface - Reduce fear and anxiety
Great negative effect - Style - Reduce fear and anxiety

Comparisons with full similarity (Score: 2) Total number of comparisons 21

Colour - Green - Reduce fear and anxiety
Colour - White - Reduce resentment and anger
Colour - Orange - Reduce depression and stress
Colour - Yellow - Promote bargaining and discovery
Colour - White - Promote understanding and acceptance
Shape - Rectangle - Promote understanding and acceptance
Material - Soft Furnishing - Reduce fear and anxiety
Material - Soft Furnishing - Reduce depression and stress
Material - Oak Finish or Leather - Reduce depression and stress
Material - Glass - Promote bargaining and discovery
Material - Metal, Wood, Paper, Lino or Oak Finish - Promote bargaining and discovery
Material - Glass or Leather - Promote understanding and acceptance
Style - Contemporary - Reduce fear and anxiety
Style - Contemporary - Promote bargaining and discovery
Style - Contemporary - Promote understanding and acceptance
Great positive effect - Colour - Reduce fear and anxiety

Great positive effect - Shape - Reduce fear and anxiety
Great positive effect - Material - Reduce fear and anxiety
Great negative effect - Colour - Reduce fear and anxiety
Great negative effect - Shape - Reduce fear and anxiety
Great negative effect - Seating - Reduce fear and anxiety

Chapter 6 Discussion

6.1 Introduction

The ability of manufacturing organisations to exploit product and process change has been identified as providing a critical competitive advantage for UK manufacturing organisations BERR (2008). The sustainment of high levels of competitive advantage, has resulted in ‘process change’ becoming an everyday event as opposed to being ‘exceptional’ to normal working practices. Changes in working practices are normally accompanied by changes in behaviour of employees undergoing change caused by the emotional disturbances that accompany these changes.

There are a range of management methods, for example through training and communication, by which dysfunctional behaviour to change can be mitigated. This project examines a previously neglected area, i.e. the effect of work place ‘interior’ design. Within ‘non-manufacturing’ environments, the huge effect of interior design has been widely recognised within the research and application literature. Within the manufacturing environment work place design on behaviour has been limited to improving physical aspects of work places that only improve manufacturing cost, quality and delivery performance. Hence, lean practices such as 5S (workplace layout) and cellular manufacturing (material flow) have been widely adopted for their ability to provide only those performance improvements.

The effect of workplace design on the emotional behaviour of employees undergoing process improvements, such as 5S and cellular manufacturing, has not been examined. This research aims to address this issue by the development of a tool (IDCCST) for selecting interior component characteristics that have beneficial effect on the range of emotional behaviour experienced as employees move through the change process.

Underlying this research is the recognition that individual employees will have different emotional reaction and levels of reaction at the different stages of the change process. Hence, an individual design for a work place interior may only have beneficial effect on a limited number of employees. Making this problem even

greater is that manufacturing environments are spaces where a diverse range of people will meet, in terms of, for example hierarchical position within the company's organisation.

Therefore, the work undertaken within this project, is not intended to provide precise links between interior design component characteristics and change management emotional behaviours, but a first attempt at providing an increased level of understanding. Having stated this, the scope of the research does not include identifying and providing an understanding of the psychological reasons why such behavioural effects take place during the change process; nor does it identify nor identifying the nature of the relationship between the improvement processes and emotional behaviour particularly in terms of the relative effects on the change process of each individual behavioural type.

The tool (IDCCST) for selecting interior design characteristics will be made available through the internet and will allow additional contributions to be made to improve the accuracy of the characteristic-behaviour links. In addition, if the ratio 80/20 percent is applied to the behavioural effects of interior design characteristics on individuals there should exist a limited set of these characteristics that will have recognisable beneficial effects on a high percentage of staff undergoing change.

The research aim was to design a support tool (IDCCST) for selecting workplace characteristics that take account of the emotional responses of the workforce.

A literature review, discussed in Section 6.1, was initially undertaken to identify the extent of the current knowledge concerning the links between ID components and emotional behaviours. Although there exists a large body of work in this area the bulk of this work related to the effect of colour on emotions. Insufficient research had been undertaken linking other interior design components and/or their characteristics with the emotional behaviour they influence. In order to collect this knowledge a questionnaire was developed and posted on web-based discussion forums that focussed on process change and improvement topics. The results collected from the survey were then used to develop the ID characteristic selection tool (IDCCST).

Prior to the design of the questionnaire a decision was made regarding the level of information requested from respondents. In this respect it was decided, on the advice from interior design academics, not to request from respondents a measurement of the level of effect on their behaviour due to change.
It was felt expecting too much from respondents who it felt would be sufficiently experienced to link characteristics with behaviours as they would have insufficient knowledge and or experience to rank the effects.

The Interior Design Profession's Body of Knowledge 2005 Edition (Martin and Guerin, 2005) has been used to identify the interior design components that should be included in this research, i.e.: colour, shape, material, seating, surface and style. Although additional components listed in the above reference included ‘lighting’ and ‘layout’ how ever these were not included since their design characteristics within working environments, particularly manufacturing work spaces, are dictated by government legislation and/or the need for best practice ergonomic and process efficiency practices. These processes include facilitating smooth material flow, minimising work-in-progress and use of 5S work place efficiency exercises.

Selecting the individual characteristics for each component represented a challenging problem since each component had potentially a large number of characteristics. To resolve this situation either basic characteristics were chosen, (e.g. primary, secondary and tertiary colours), or characteristics were chosen based on their inclusion in the majority of references examined, (e.g. style which included modern, contemporary and traditional styles such as ‘Victorian’.

A wide range of characteristics were chosen for each design component in order to:

a. Inclusive in terms of variability in the profiles of respondents expected to contribute to the survey for example age group, contribution to process changes, interior design experience and hierarchical level within an organisation,
b. if characteristics were not included their behavioural effect may not be known,
c. To ensure sufficient variety to elicit the range of results that would indicate if respondents perceived differences in the their behavioural duets individual component characteristics, and
d. To generate useful knowledge that would form the basis of future studies.

6.2 Statistical Analysis of Survey Data

Table 6.1 provides the results, at component level, from the analysis of survey data. For all components the statistical analysis identified that there were large differences, (i.e. minimum 67%/8 and maximum 91%/42), between the component characteristic that received the 'minimum percentage selection's and the component characteristic that received the maximum percentage selection's. These differences were taken as an overall indication that the respondents had the ability to recognise the effects of component characteristics on change management behaviours.

	% RESPONDENTS						NUMBER OF RESPONDENTS					
STATISTICAL MEASURE	COLOUR	SHAPE	MATERIAL	SEATING	SURFACE	STYLE	COLOUR	SHAPE	MATERIAL	SEATING	SURFACE	STYLE
Minimum value	0%	0%	0%	0%	0%	0%	0	0	0	0	0	0
Maximum value	67%	71%	91%	80%	73%	67%	8	10	11	12	42	8
Mean	28%	30%	32%	28%	29%	30%	3	3	4	3	5	3
Mode	20%	38%	33%	0%	33%	0%	1	3	3	1	1	3
Median	25%	30%	33%	27%	27%	33%	3	3	4	3	3	2
Standard Deviation (SD)	19%	17%	20%	21%	20%	19%	3	2	3	3	8	2
Mean + SD	47%	47%	52%	49%	49%	49%	6	5	7	6	13	5
Mean + (2SD)	65%	63%	72%	71%	69%	67%	9	8	9	9	21	7
Coefficient of variation	66%	56%	61%	76%	68%	61%	0.72	0.68	0.66	0.89	1.58	0.76
Range	67%	71%	91%	80%	73%	67%	8	10	11	12	42	8
Number of Characteristic-Behaviour links with >=68%<95% (Mean + SD) probability of being actual links	9	2	6	8	8	9	13	5	8	4	1	6
Number of Characteristic-Behaviour links with >95% (Mean + 2 SDs) probability of being actual links	3	3	3	1	3	2	0	3	2	4	4	3
'Characteristic Choice' correlations, (i.e. >=0.8), between respondents 'Change Management Behaviours'	0	0	0	0	0	0	1	0	0	0	9	1
'Behaviour' correlations, (i.e. >=0.8), between respondents 'Characteristic Choices'	4	1	6	11	10	6	4	2	6	8	12	6

Table 6.1: Results of Statistical Analysis of Survey Data

The 'mode' value was calculated with the objective of being used as a confirmation of the overall opinion of all respondents to the degree to which the links between interior design component characteristic and change in behaviour which could be considered to be a 'real' relationships, i.e. the higher the mode value the greater is the overall opinion of the respondents that 'real' links exist between interior design component characteristics and change in behaviour. However, since the "mode" value is that value that occurs most often its validity depends on the number of values used to identify the mode. In this instance only 55 values were available

making the use of the ‘mode’ invalid, i.e. when compared with ‘mean’ values 25% of their corresponding ‘mode’ values were below the mean, 17% equal to the mean, 41% higher than the mean and 17% were zero.

The "median", i.e. the "middle" value in a list of numbers which has been listed in numerical order, was also used to provide confirmation of the degree to which the links between interior design component characteristics and change in behaviour could be considered by respondents to be ‘real’ relationships, i.e. the greater the mode value the greater the likelihood that the link was a real relationship. This value was used within the results analysis when extreme ‘outlier’ values of ‘number of responses’ are present and resulted, when compared with ‘mean’, values 42% of their corresponding ‘mode’ values were below the mean, 42% equal to the mean, 16% higher than the mean.

6.3 Trustworthiness of Results

The statistical significance in Section 6.2.1 shows that the survey results were distinguishable from chance, it did not fully indicate the ‘trustworthiness of the results’. In this respect, it was necessary to determine whether the magnitude of the effects of characteristics was worth considering, (e.g. what effect do characteristics have on reducing the period over which process changes become sustainable), i.e. its ‘substantive significance’. Here, in analysing the results of the survey the ‘level of response’ for a specific ‘component characteristics-behaviour’ link was taken to be indicated by the ‘percentage of respondents’ and ‘number of respondents’ selecting the link. Although the survey did not explicitly seek to identify the relative level of effect on change behaviour it could be argued that the more respondents who identified the occurrence of such effects would indicate the apparent level of effect, i.e. the higher the level of effect the more respondents would have perceived this effect. The substantive significance of the survey results requires an estimation of the ‘effect size’ which emphasises the difference in size between two samples, i.e. the magnitude of an effect size is correlated with its importance. Here the ‘effect size’ is the level of influence that a component characteristic has on an individual change in behaviour. The ‘effect size’ is measured by the number of respondents who identified a characteristic-behaviour link. The following measurement of substantive

significance has been adopted in this research, i.e. select characteristics that have >=68%, (>= mean + 1 standard deviation), probability of being links, based on the number of respondents choosing them. In order of ranking these are Colour with 12 and 13 & 13 style with 11 & 9, material with 9 & 10, and surface with 11 & 5. The component with the least effect was Shape with 5 & 8. Table 6.2 contains those characteristic-behaviour links with >68% probability of being actual links, i.e. those with greater then mean + one standard deviation number of survey respondent

	Percentage Respondents				
COMPONENT	**Reduce fear and anxiety**	**Reduce resentment and anger**	**Reduce depression and stress**	**Promote bargaining and discovery**	**Promote understanding and acceptance**
COLOUR	Green White	Brown Blue Grey	Pink Orange Yellow Green	Black Red	White Green Pink
SHAPE	Round Circle Curved	Semi-circle	Oblong	Triangular	
MATERIAL	Upholstery fabrics Carpets		Soft Furnishings	Glass Lino	Glass Leather Paper
SEATING	Sofa Armchairs		Rocking chair Armchairs Sofa	Plastic chairs Flat pack seating Metal stools Scandinavian	
SURFACE	Wood	Wood	Wood	Shiny Mirror Acrylic Metal	
STYLE	Victorian Contemporary/ modern		Art Deco Contemporary/ modern	Art Deco 1990s Contemporary/ modern Art Nouveau	Contemporary/ modern

selections. Within each ‘component-behaviour’

Table 6.2: Characteristics ranked according to Percentage of respondents

Number of Respondents					
	Reduce fear and anxiety	**Reduce resentment and anger**	**Reduce depression and stress**	**Promote bargaining and discovery**	**Promote understanding and acceptance**
COLOUR	Green White Blue	Blue White	Orange Green Yellow Pink	Blue	Green White
SHAPE	Circle Curved Round	Curved	Circle Curved	Curved	Circle
MATERIAL	Soft Furnishings Upholstery fabrics Carpets Wood	Wood	Soft Furnishings Oak finish	Glass	Glass Leather Wood
SEATING	Sofa Armchairs Rocking chair	Sofa	Armchairs Rocking chair Sofa		Armchairs
SURFACE	Granite	Granite	Granite	Granite	Granite
STYLE	Contemporary/modern Victorian	Art Deco	Art Deco Contemporary/modern	Art Deco Contemporary/ modern Arts and crafts	Contemporary/modern

Table 6.3: Characteristics ranked according to Number of respondents

category the characteristics were ranked according to the %/number of responses they received. Where conservative selections need to be made the >=95% probability threshold could be used for selecting characteristics, for example in work areas where changing interior design components and characteristics was costly and/or time consuming. There also appeared to be evidence that similarities exist in

the effect of characteristics across the sequence of behaviours, i.e. in terms of the probability of their being characteristic-behaviour links. The graphs are illustrating the correlations which are shown in Chapter 5. Analysing the results in terms of the criteria proposed by Lincoln and Guba (1985) for establishing their "trustworthiness" using qualitative methods, produced the following assessments, i.e.:

- **Credibility:** The "truth" of the findings, as viewed through the eyes of those being observed or interviewed and within the context in which the research is carried out. Here, manufacturing-based industrial project partners of the Lean Engineering Research Group have been interviewed and have confirmed the overall credibility of the methods used and results obtained.
- **Transferability:** The extent to which findings can be transferred to other settings. In order for findings to be transferable, the contexts must be similar. Therefore, it is the role of the researcher to identify key aspects of the context from which the findings emerge and the extent to which they may be applicable to other contexts. In this respect lean practices have now been implemented in a wide range of work environments which include hospitals, miscellaneous government departments and banks. The fundamental principles of change management has been found to be applicable to all of these environments. Hence, it is sufficient evidence to assume that the work undertaken as part of this project is applicable to all of these work environments as well as additional environments such as solicitor’s offices and doctor’s surgeries.
- **Dependability:** The extent to which the research would produce similar or consistent findings if carried out as described, including taking into account any factors that may have affected the research results. The triangulation of the results, (Table 3.5), undertaken using questionnaires, interviews and literature research has improved the dependability of the project results.
- **Conformability:** Researchers need to provide evidence that corroborates the findings. Such evidence should come directly from subjects and research context, rather than the researcher's biases, motivations, or perspectives. Here, industrial project partners of the Lean Engineering Research Group have been interviewed and have confirmed the overall conformability of the methods used and results obtained.

6.4 Analysis of Comments

Table 6.4 provides the survey responses, for all participants, to Question 9, i.e. please add any further experiences you have concerning the effect of Interior Design on the change management process.

COLOUR	1. Adds a new dimension to the reaction of how people act and react. Example, before staff room was changed the mood was dreary. After it was changed, a better mood sunk in upon entering the staff area. This has been an effective changed as the staff mood changed on the shop floor. 2. Calming 3. Can be associated with negative memories... particularly where institutional colours are in common usage. 4. Darker colours increase depression and lack of control 5. I have never had any opportunity to change the colour of the environment of any change management type meetings; I assume anything outrageous would be distracting. 6. Use of colour that suggests change (i.e. tonal gradations, "ombre") 7. Warm, fall colours, accent walls - help foster team thinking
MATERIAL	8. Natural materials are often better than man-made. 9. Use of familiar materials (i.e. natural fabrics, wood, stone, metal) used in slightly novel ways is inspiring but familiar bridging old and new
SEATING	10. Change of seating, can change the setting and mood from stiff to relax. 11. Close and comfortable is often better than separated and rigid/firm 12. Comfortable seating encourages teams/reduces stress 13. Relaxing
SHAPE	14. Institutional shapes (derived from flat surfaces and sharp angles) are often not conducive to creative thinking.

	15. Long, rectangular rooms with a 'head' of the table create negativity
STYLE	16. Fussiness negatively impacting stress, anxiety and acceptance; cohesiveness inspiring confidence and trust 17. I have noticed that calming and comfortable working environments have a positive effect on peoples reaction to any changes. 18. Needs to be interesting/intriguing and non-threatening. 19. Not overly experienced with style 20. This survey I presume assumes that all the basics are already covered. In my opinion no amount of bean bags and lava lamps will improve the change process without honest, clear and frequent communication and proper stakeholder management.
SURFACE	21. Needs to be warm and touchable.

Table 6.4 Survey Respondent Comments

In terms of importance of categories, as judged by the number of comments per ID component, these are Colour and Style with Surface being the least important (one general comment). The statistical analysis of survey results shown in Table 6.1, also identifies Colour and Style having high values for 'Number of Characteristic-Behaviour links with >68% probability of being actual links'. The effect of colour is commented on in terms of its effects on both positive and negative emotions with Comment 1 providing an example of the powerful and immediate effect of a colour change creating a positive mood effect. It can also create a wide range of emotional effects from 'calming' to 'depression', 'lack of control' and the 'fostering of team thinking'. A warning is provided that the use of 'institutional colours' can be associated with negative memories. Style also seems to possess the power to have immediate effects on personnel since, as with colour, its instantaneous exposure creates spontaneous reactions.

In terms of materials their use in 'bridging old and new' reflects the need to consider both in any interior design-for-change management situation. The importance of

comfortable seating that relaxes its occupant is commented on as an essential element of team meetings. The use of interior design to calm and relax people is indirectly inferred and directly identified in - 50% of the comments and appears to be a major way of contributing to the change management process. the comments strongly stated indicate both the positive effect of good interior design on work spaces, e.g. ‘Adds a new dimension to the reaction of how people act and react’ and highlights the dangers of poor interior design, e.g. ‘Long, rectangular rooms with a 'head' of the table creates negativity’.

Approximately 50% of the comments highlight positive effects of interior design and 50% negative effects. This may indicate that the amount of knowledge in respect to good interior design principles within working areas is still insufficient to enable poor design to be replaced with good design. As one comment queries this work is predicated on the basis that the basic communication and stakeholder management strategies are in place and active.

6.5 Benefit-Harm Analysis

Interior design component characteristics can have both beneficial and negative effects on emotional behaviour during the change process. It is worthwhile, therefore, to attempt to undertake benefit-harm analyses which is a key requirement in the medical profession particularly where drugs have both positive and negative effects and where animals are used for scientific purposes. It is essential, for ethical purposes to ensure each interior design component the negative effect on emotional behaviour is minimised and i.e. the level of harm must be as low as possible and the separation between harm and benefit as large as possible.

Additional criteria identified for potential use to assess benefit-harm levels within this research include (i) mean level of behavioural change improvement in users, (ii) duration of improvement and (iii) proportion of showing with improvement. In terms of ‘harm’ this was centred on the seriousness of dysfunctional behavioural change reactions. However, in order to use these a greatly more detailed survey would need to be undertaken leading to increase numbers of respondents.

Two approaches were, therefore, developed based on the Puhan, and co-researcher's, (Puhan et. al. 2012), review of a range of existing quantitative approaches for benefit-harm assessment where effects were classified according to the following categories, i.e. Benefit, no harm; Benefit and harm; Harm, no benefit; No benefit, no harm. The two approaches entailed changing categories to characteristics that had the 'greatest positive effects' and 'greatest negative effects' on change management behaviour. Hence, two additional questions were included in the survey, i.e.:

1. Survey question 7 asked respondents to provide their opinion on interior design components and their relative 'positive' effects on the emotional behaviour exhibited during the change process.
2. Survey question 8 asked respondents to provide their opinions on interior design components and their relative 'negative' effects on the emotional behaviour exhibited during the change process

The first approach measured the 'effect size', as with result trustworthiness in Section 6.2, by the number of respondents who identified a characteristic-behaviour link. Table 6.5 identifies the differences between the statistical values calculated for the results of Questions 7 and 8. Here, the relatively small bias towards 'greatest positive effects' between maximum and minimum values indicated that in general there was a need to ensure complete removal of ID characteristics with 'greatest negative effect' components.

	Difference between Greatest Positive and Greatest Negative Effects		**Positive (P) or Negative (N) Effect**	
Statistical Result	**% Respondents**	**No. of Respondents**	**% Resp.**	**No. Resp**
Minimum value	34%	0	N	N
Maximum value	50%	8	P	P
Mean	0.1%	2	P	P
Mode	-7%	2	N	N
Standard Deviation (SD)	18%	2		

Table 6.5 Comparisons of Questions 7 and 8 survey results

The second approach involved the down selection of characteristic-behaviour relationships using the statistical analyses in Chapter 5 to down select those with potentially the greatest and least effect. As with the first approach 'effect size' was measured in the same manner with the results shown in Table 6.6.

Type of Effect	%/No. of Respondents	Reduce fear and anxiety	Reduce resentment and anger	Reduce depression and stress	Promote bargaining and discovery	Promote understanding and acceptance
Interior Design Components with Greatest Positive Effects on Change	%	Colour Style		Colour	Shape Material	Style
	No.	Colour Style		Colour	Shape	Style
Interior Design Components with Greatest Negative Effects on Change Behaviours	%	Shape Material Style	Shape	Material		Surface
	No.	Shape Colour Surface Style	Shape	Material Colour	Seating	Surface

Table 6.6: Positive and negative effects of Interior design components

6.6 Workplace Interior Design Component Characteristic Selector

The 'Workplace Interior Design Component Characteristic Selector' developed using the research outputs is described in Appendix 3. The selector uses spreadsheet-based tables and functionality to represent the relationships between Industrial Design Components and their Characteristics, Change Management Behaviours and Work Place Areas. Relationships are established between Interior Design Components Characteristics and Change Management Behaviours using the series of Correlation Coefficients – No. of Responses tables within Chapter 5, e.g. Table 5.5 Correlation Coefficients – No. of Responses – COLOUR'.

These tables enable, for each change management behaviour, the two highest ranked component characteristics that help modify behaviours to be selected. The characteristics selected possessed the highest ‘No. of Responses’.

Relationships between interior design areas and component characteristics were identified in terms of the effects on the change management processes, i.e. specific interior design areas were identified as having little effect on change management behaviours, e.g. in term of ‘colour’ it was considered that the colour of ‘windows’ and ‘décor’ would have little effect.

6.7 Practical application of the research

Practical applications of the research can be identified through the effect of change in behavior, through improved interior design of the working areas. The key performance indicators and metrics for change management fall into two categories, i.e.:

1. Cost, quantity, quality, lead time and range consequences of undertaking process and service improvement changes, where typical performance metrics include:

    a. number of changes implemented to services which met the customer’s agreed requirements in terms of quality, cost, lead time and delivery reliability,
    b. number of changes that fail to meet their cost, quality and delivery targets,
    c. change success rate, i.e. percentage of changes deemed successful,
    d. number of satisfied customers
    e. number of critical-to-success improvement changes made
    f. number of project teams involved in change projects
    g. number of change projects completed
    h. number of disruptions to services, defects and rework caused by poor or incomplete impact changes, and
    i. Average time to implement based on urgency/priority/change type.

2. Cost, quantity, quality, lead time and range benefits of the changed process and service improvements, where typical performance metrics include:

    a. number of defective components produced,

b. cost of poor performance, e.g. replacing defective items, lost repeat sales through late deliveries
c. level of capability of producing increased variety of products,
d. adherence to schedule, and
e. work-in-progress levels

Table 6.7 identifies the links between the above performance metrics and change behaviours. In addition, changed behaviours, through improved interior design will greatly improve the ability of organisations to undertake successfully change management tasks and, therefore, to achieve the range of objectives involved in the process. Table 6.8 identifies the links between 'change behaviours' and the 'change management objectives' they are critical to help achieving. This table also shows the critical need to reduce the behaviour of 'fear and anxiety', 'resentment and anger' and 'depression and stresses', since these will underpin the personnel engagement needed to achieve all the change management objectives. The remaining behaviours, i.e. 'bargaining and discovery' and 'understanding and acceptance' will, then generate motivation that promotes increased innovation, participation, change performance and sustainability.

PERFORMANCE METRICS		CHANGE BEHAVIOURS	Reduce fear and anxiety	Reduce resentment and anger	Reduce depression and stress	Promote bargaining and discovery	Promote understanding and acceptance
QCD of Improvement Change Activities	Number of changes implemented to services which met the customer's agreed requirements in terms of quality, cost, lead time and delivery reliability		✓	✓	✓		✓
	Number of changes that fail to meet cost, quality and delivery targets		✓	✓	✓	✓	
	Change success rate		✓	✓	✓	✓	
	Number of satisfied customers		✓	✓	✓		✓
	Number of critical-to-success improvement changes made		✓	✓	✓	✓	
	Number of project teams involved in change projects		✓	✓	✓		✓
	Number of change projects completed		✓	✓	✓		✓
	Number of disruptions to services, defects and rework caused by poor or incomplete impact changes		✓	✓	✓		✓
	Average time to implement based on urgency/priority/change type		✓	✓	✓		✓
QCD Improvements from Change Activities	Number of defective components produced		✓	✓	✓		✓
	Cost of poor performance		✓	✓	✓	✓	
	Level of capability of producing increased variety of products		✓	✓	✓	✓	
	Adherence to schedule		✓	✓	✓	✓	
	Work-in-progress levels		✓	✓	✓		

Table 6.7: Links between Change Management Performance Metrics & Change Behaviours

Change Management Objectives / Change Behaviours	Reduce fear and anxiety	Reduce resentment and anger	Reduce depression and stress	Promote bargaining and discovery	Promote understanding and acceptance
Establish a Culture of Innovation	✓	✓	✓	✓	✓
Establish Principles for Change	✓	✓	✓		
Develop Innovative Strategies	✓	✓	✓	✓	
Establish Best Practices for Innovation	✓	✓	✓	✓	
Develop Change Leaders	✓	✓	✓		
Empower Agents of Change	✓	✓	✓		
Identify Change Accountability & Responsibility	✓	✓	✓		
Align Employee Objectives to Change	✓	✓	✓		
Communicate & Socialize Change	✓	✓	✓		
Address Concerns and Improve Change	✓	✓	✓	✓	✓
Apply Knowledge to Change	✓	✓	✓	✓	
Train Employees to Prepare Them For Change	✓	✓	✓	✓	
Achieve Employee Participation In Change	✓	✓	✓	✓	✓
Create a Sense of Urgency For Change	✓	✓	✓		
Maintain Change Momentum	✓	✓	✓	✓	✓
Recognize & Celebrate Change Milestones	✓	✓	✓		
Manage Performance	✓	✓	✓	✓	✓
Reward Agents of Change	✓	✓	✓		
Gain Acceptance of Change	✓	✓	✓		
Learn From Change	✓	✓	✓	✓	
Measure Change Results	✓	✓	✓		
Sustain Change	✓	✓	✓	✓	✓

Table 6.8: Links between Behaviours and Change Management Objectives

6.8 Physical spaces for the application of the Interior Design Component Characteristic Selector Tool (IDCCST)

The application of the IDCCST tool within industry and commercial organisations included: -

1. Rooms and/or areas used to facilitate the change management process. These included office work areas, team training rooms, team meeting areas, change programme information rooms, cafeterias and rest rooms, poster boards, simulated work environments, visual management boards.

2. Offices, rooms and areas used to undertake the changed processes. These included operator factory floor-based work areas, team factory floor-based work cells and visual management and work flow control display boards.

The following are the applications of interior design components within examples of the workspace.

Figure 6.1 Informal team meeting areas

IDCCST Analysis of Figure 6.1

Components	ID characteristics	Change management effects
Colour		Green/white White: Reduce fear and anxiety Reduce resentment and anger Promote understanding and acceptance Green: Reduce fear and anxiety Reduce depression and stress and promote understanding and acceptance
Style	Contemporary	Reduce fear and anxiety Reduce depression and stress promote bargaining and discovery promote understanding and acceptance
Material	Wood oak finish	Reduce depression and stress and promote bargaining and discovery

Surface		Gloss paint	Reduce resentment and anger reduce depression and stress and promote and understanding and acceptance
Seating		Sofa	Reduce fear and anxiety and reduce resentment and anger
Shape	Rectangle	Promote understanding and acceptance	

Figure 6.2: Team meeting rooms

IDCCST Analysis of Figure 6.2

Components	ID characteristics	Change management effects
Colour	White	Reduce fear and anxiety, Reduce resentment and anger, Promote understanding and acceptance
Style	Contemporary	Reduce fear and anxiety, Reduce depression and stress, Promote bargaining and discovery, Promote understanding and acceptance
Material	Glass	Promote understanding and acceptance
Surface	Shiny	Promote bargaining and discovery
Seating	Scandinavian/Hard back Chair	Promote bargaining and discovery
Shape	Rectangle	Promote understanding and acceptance

Figure 6.3: Change programme communications room

IDCCST Analysis of Figure 6.3

Components	ID characteristics	Change management effects
Colour	Blue	Reduce resentment and anger, Promote bargaining and discovery
Style	Contemporary	Reduce fear and anxiety, Reduce depression and stress promote bargaining and discovery, Promote understanding and acceptance
Material	Carpet	No beneficial effect
Surface	Matt Paint	Reduce resentment and anger, Reduce depression and stress, Promote and understanding and acceptance
Seating	Plastic chairs	Promote bargaining and discovery
Shape	Rectangle	Promote understanding and acceptance

Figure 6.4: Change programme and implementation planning rooms

IDCCST Analysis of Figure 6.4

Components	ID characteristics	Change management effects
Colour	White	Reduce fear and anxiety Reduce resentment and anger, Promote understanding and acceptance
Style	Contemporary and Art Deco	Contemporary: Reduce fear and anxiety, Reduce depression and stress, Promote bargaining and discovery, Promote understanding and acceptance Art Deco: Reduce resentment and anger, Promote bargaining and discovery
Material	Wood oak finish	Reduce depression and stress, Promote bargaining and discovery
Surface	Matt Paint	Reduce resentment and anger, Reduce depression and stress, Promote and understanding and acceptance
Seating	Hard back chair and Plastic chair	Plastic chair: Reduce depression and stress, Promote bargaining and discovery
Shape	Angular and sharp	No beneficial effect

In terms of application on the shop floor there are limited opportunities of affecting the change management process due to the need to design work spaces for maximum efficiency, health and safety. Examples of such areas are included below

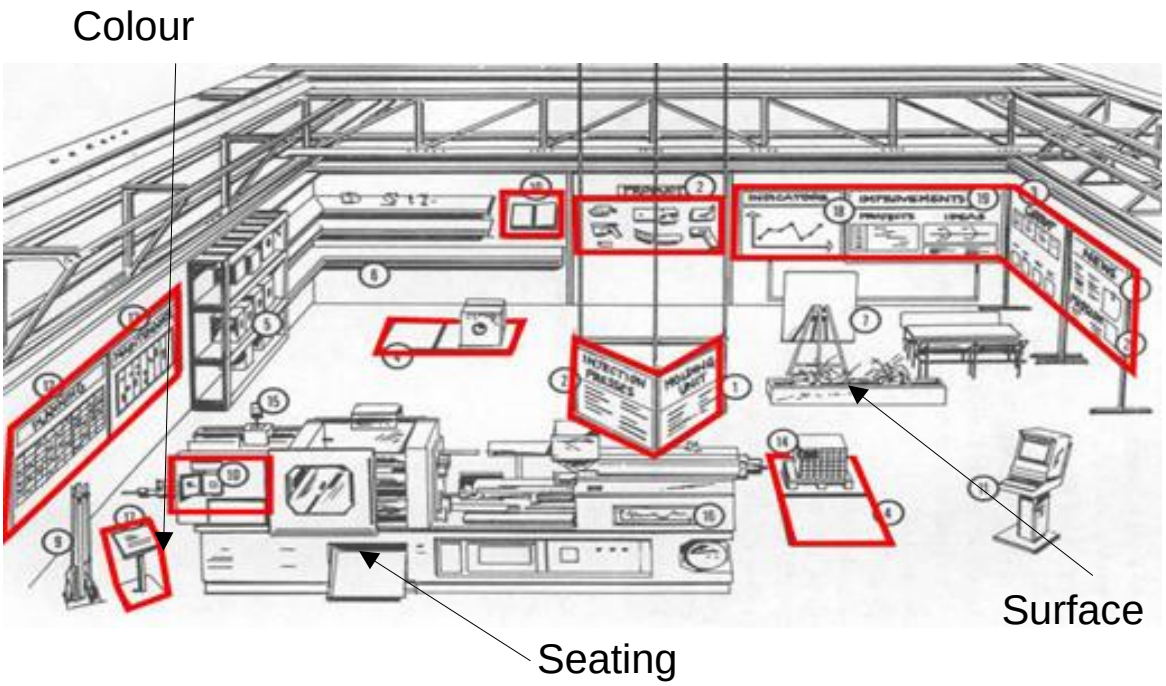

Figure 6.5: Shop floor Area with ID Components identified
REF: http://www.vsi.eu/visualmanagement.php

Figure 6.6: Shop floor Area
REF: http://www.vsi.eu/visualmanagement.
http://events.aviationweek.com/current/lssmro/tour.htm php

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Figure 6.7: Visual Shop floor Performance Management Board
REF: http://events.aviationweek.com/current/lssmro/tour.htm

Caterpillar's Simulated Work Environment (SWE) has been designed to teach employees about the techniques of changing processes using lean manufacturing by allowing them to have hands on experience within a simulated environment which is both controlled and safe. The following images indicate the scope of using the ISCCST in such environments to influence emotional behaviours during such training periods.

Figure 6.8: Image of simulating working environment 1

Figure 6.9: Image of simulating working environment 2

Figure 6.10: Image of simulating working environment 3

Chapter 7 Conclusions

The aim of this research was to develop a design support tool (IDCCST) for selecting work space characteristics that take account of the emotional responses of the workforce.

The above aim of this project has been achieved.

Objective 1: To identify and classify the characteristics of the interior designs of individual work spaces. These characteristics include colour, shape, texture and style of interior design objects within the work spaces.

Conclusion 1: This objective has been achieved through the critical analysis of research and application interior design literature. Both the individual components of interior designs were identified, i.e. Colour, material, seating, shape, style and surface, and their individual characteristics, see Tables 5.1, 5.6, 5.11, 5.16, 5.21 and 5.26.

The majority of the research and application literature for individual interior design components and their characteristics made extensive use of the judgements and opinions of experienced interior designers who had particular expertise in the application of individual interior design characteristics. No formal experiments had been undertaken to quantitatively prove relationships existed or to quantify the level of effect individual characteristics had on specific emotional behaviours. However, in many cases there was sufficient information within the literature to substantiate links between many interior design characteristics and the emotional behaviours they stimulated.

Conclusion 2: The literature research was also used to develop the survey questionnaire which itself provided the final input of interior design component characteristics and the emotional behaviours they elicited. In this respect, several interior design components were removed from the the survey questionnaire since these components and their characteristics are determined by government health and safety at work regulations and/or ensuring the efficiency of physical manufacturing practices such as material flow and storage,

Conclusion 3: In terms of the effectiveness of the Interior Design Component Characteristic Selector Tool, (IDCCST), the importance of ID categories was judged by the number of comments per ID component, i.e. these were Colour and Style with Surface being the least important. The Colour ID component is commented on in terms of its effects on both positive and negative emotions, the power and immediacy of these effects and the range of emotional effects from 'calming' to 'depression', 'lack of control' and the 'fostering of team thinking'.

The statistical analysis of survey results shown in Table 6.1, also identified Colour and Style as having high values for 'Number of Characteristic-Behaviour Links with >68% probability. Respondents comments from the survey also provided a warning that the use of 'institutional colours' can be associated with negative memories. Style also seems to possess the power to create immediate and spontaneous effects on personnel.

The tasks involved in the creative problem solving process, Section 3.2.3 Generic Improvement Process Steps, require a variety of skills to undertake, including 'creativity' to identify novel solutions to problems, 'analysis' to compare alternative solutions and 'decision-making' to choose the most appropriate solution to implement. In terms of the 'best' interior design solutions to implement there is a case, therefore, for providing a variety of interior design components particularly in terms of colours, styles and seating. Changing the interior design components and characteristics as personnel move through the different stages of the creative problems solving may be advantageous. This may be achieved by moving to different physical locations or altering the décor of the room (for example judicious use of partitions) to undertake each store of creative problem solving process.

The use of interior design to calm and relax people is indirectly inferred and directly identified B7 -50% survey questionnaire respondents on and appears to be an effective way of positively contributing to the change management process.

Objective 2: To identify, through literature research, the sequence of emotional behaviours exhibited across the 'existing' to 'new' working practice change process.

Conclusion 4: This objective has been achieved through the critical analysis of the research and literature for the change management process. The analysis of this literature identified a wide variety of alternative change management models, (Appendix 1), having dissimilar emotional behaviours although all models were adaptions from the basic Grief and Loss Model proposed by Kubler-Ross, (Kubler-Ross, 1969). In order reduce the large number of individual emotional behaviours used within the survey questionnaire, the emotional behaviours were grouped into 5 distinct areas, i.e. Reducing fear and anxiety; Reducing resentment and anger; Reducing depression and stress; Promote bargaining and discovery; and Promote understanding and acceptance. These groups provided a single sequence of emotional behaviours through the change management process. The groups and their sequence enabled respondents to complete the questionnaire in a relatively short period of time as well as enabling the respondents to associate with their practical experience of behaviours occurring during change processes.

Through the above research the sequence of emotional behaviours exhibited by people progressing through working practice changes was, identified.

Conclusion 5: The effectiveness of the interior design tool (IDCCST) is likely to be effected by the complex nature of the manufacturing change process environment. Here, at any point in time, there may be multiple improvement projects being undertaken simultaneously. Individual staff may be involved in more than one channel improvement project, and projects may be at different stages. Hence, individual members of staff could have different attitudes emotional reactions and behaviours, depending on the project and there involvement.

Objective 3: To establish the relationships between interior design characteristics and the basic emotional behaviours.

Conclusion 6: This objective has been achieved through the use of the questionnaire-based survey critical analysis of the research and application change questionnaire based survey, (Chapter 4)

Conclusion 7: The statistical analysis undertaken in Chapter 5 identified that there were large differences between component characteristics in terms of the percentage number of respondents that linked them to specific emotional behaviour categories. This response has been used to infer the likelihood of individual characteristics having an effect on these behaviour categories. The research has not indicated the strength of these effects or the 'persistence' of these effects, i.e. length of time they are likely to persist. However, the strength of effect can be inferred from the interior design research and application literature which, on the whole, confirms the findings of the survey in terms of the types of interior design characteristics effect on emotions. The work also agrees that colour and style having the greatest effect on emotional behaviours.

Conclusion 8: In terms of the effectiveness of the interior design tool it is reasonable to expect that:

(i) the relative effects of individual components follow 80/20 percentage rule, (which is widely used in manufacturing to identify the most effective improvement solutions), which in this case states that 20% of the interior design components will have 80% of the effect on change management behaviours, and
(ii) for each interior design component the relative effects of their individual characteristics also follows the 80/20 rule which in this case states that 20% of an interior design component's range of individual characteristics will have 80% of the effect on change management behaviours.

Hence, assuming that the 80/20 percentage rule is valid supports the use, within the IDCCST of only the top two highest scoring characteristics for each component. It also supports the use of only the top two components, i.e. colour and style. This would considerable ease the application of interior design interventions within the change management process.

Objective 4: To develop a process of using relationships between interior design characteristics and emotional behaviours to develop a spread sheet based tool for suggesting interior design characteristics that assist the sequence of tasks required to undertake changes in working practices.

Conclusion 9: This objective has been achieved in this research project with the development of a spread-sheet based IDCCST and its sequence of functions detailed in Chapter 6 and screen shots provided in Appendix 3.

Conclusion 10: The relationships used to enable selection of interior design component characteristics (IDCCST) that mitigate specific change management behaviours has been established through triangulated research consisting of literature research, interviews with interior designers and lean engineers, (Chapters 2 and 3), and a questionnaire-based survey, (Chapters 4 and 5).

Although difficult to undertake, since no quantitative measures exist, was the establishment of the trustworthiness and degree of benefit-harm that the interior design component characteristics used with the IDCCST had on the change management process. In this respect the triangulation of results greatly helped to qualitatively confirm that the use of IDCCST will be essentially beneficial.

Conclusion 11: The use of IDCCST with reference to individual survey respondents who suggest for the use of interior design within the change management process, if poorly undertaken may have strong detrimental effects. In addition, these comments highlight that the effect of interior design on the change process is predicated on the basis that the basic communication and stakeholder management strategies are in place and active and basic fears, such as ‘losing one’s job’ have been negated.

Conclusion 12: The effectiveness of the interior design tool will be determined by the opportunities made available in any one company for the selected ID components and their characteristics to be applied. In this respect this research has focussed on the use of purpose-designed rooms for teams to undertaken problem solving, decision-making and training required during the change management process and before the new working processes become operational.

Chapter 8 Future Work

The following areas of future work are recommended:

1. **Comparisons with no similarity** to individual change models and the emotional behaviours they contain.

2. A different approach could also be adopted for linking emotional behaviours with the change management process by undertaking research to link the generic skills required within the change management process, (e.g. creativity, problem-solving, decision-making and data analysis), with the basic emotions required to successfully employ these skills. The IDCCST would then need to link interior design component characteristics with these generic skills making the tool applicable to a far wider range of change project.

3. The interior design component characteristics used within the IDCCST have been drawn primarily from the 'interior design' literature and as such not every component characteristic type may immediately be applicable within a manufacturing environment. However, in several cases, e.g. sofas, component characteristics seem to have a significant affect in moderating adverse change management behaviours. With respect to this issue, further work in two areas would be useful. i.e. (i) research aimed at identifying methods by which such component characteristics could be integrated within practical workplace interior designs, and (ii) research aimed at overcoming the natural reluctance of manufacturing management to introduce interior design component characteristics that do not directly contribute to manufacturing safety and efficiency.

4. It can be seen, Appendix 1, that there are many 'emotional behaviours' that are expressed during the change process. More detailed research in this area would be beneficial to the IDCCST aimed at understanding how the characteristics of the 'changed' working environments and/or the differences between existing and changed working environment, (in terms of for example

the relative levels of manual work, types and levels of work skills required), affect the emotional behaviours that may arise.

5. The IDCCST developed includes making interior design decisions for the various physical areas, e.g. floor, walls, ceiling, that make up an interior. However, the component characteristics have only been related to emotional behaviours occurring during the change process. For specific component characteristics it is assumed that they apply to all interior areas they are relevant to, e.g. a colour characteristic is applicable to walls, floor and ceiling. This assumption may not necessarily be fully correct. Hence, further work needs to be undertaken to identify the effect of interior area on the effect of component characteristics on change management behaviours. In this respect, also of benefit would be the development of ‘good practice’ examples of interior design solutions for use on individual parts of interiors, e.g. walls, floors and ceilings.

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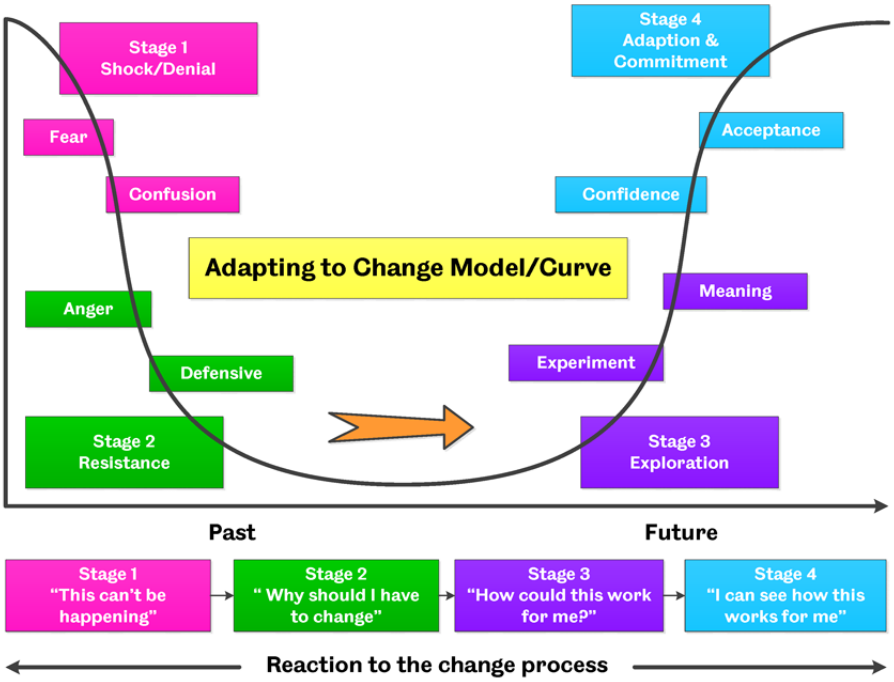
Yildirim, K. and Hidayetoglu, M.L., 2011, "Effects Of Interior Colors On Mood And Preference: Comparisons Of Two Living Rooms, 112 /2, pp 509.

Appendix 1: Images of Change Process Models

Reference: A1-A

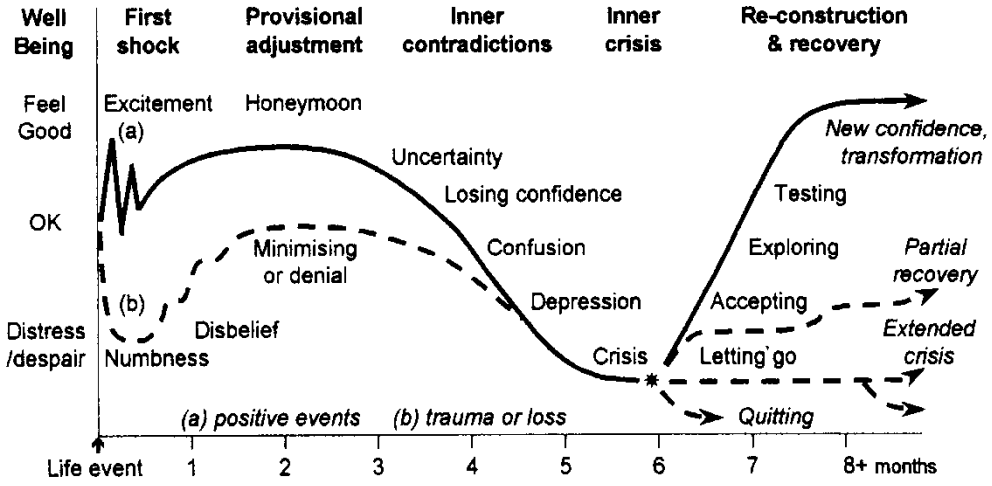


URL: http://www.sheffield.ac.uk/hr/guidance/change/toolkit/implementation/adapt

Reference: A1-B

URL: http://www.i-choose-self-improvement.com/change-curve.html

Reference: A1-C



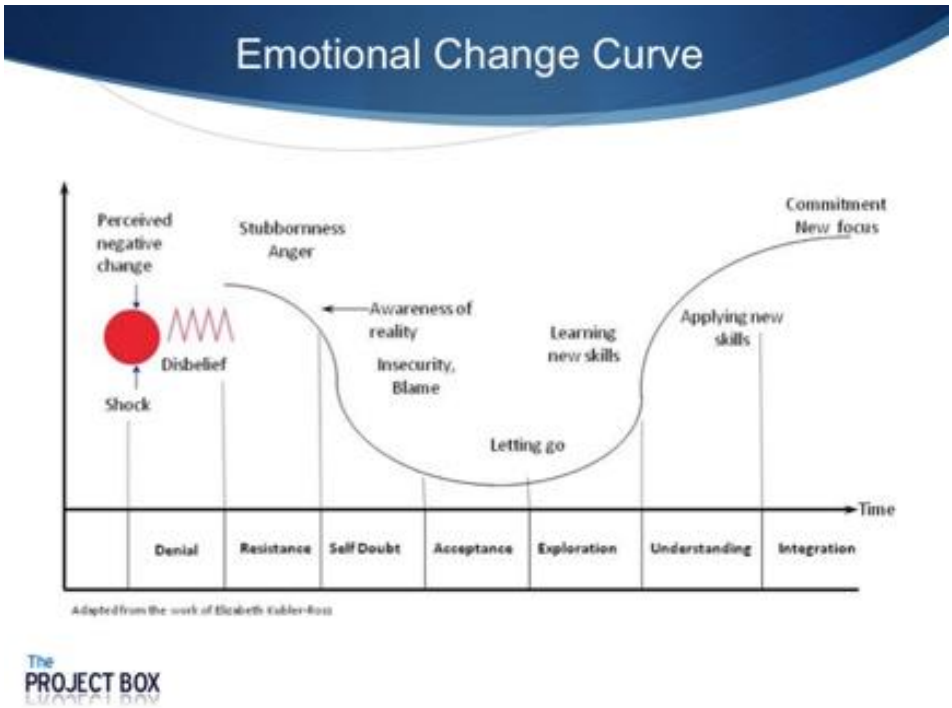
URL:

Refer ence:

A1-G

URL: http://www.eoslifework.co.uk/transmgt1.htm

Reference: A1-D

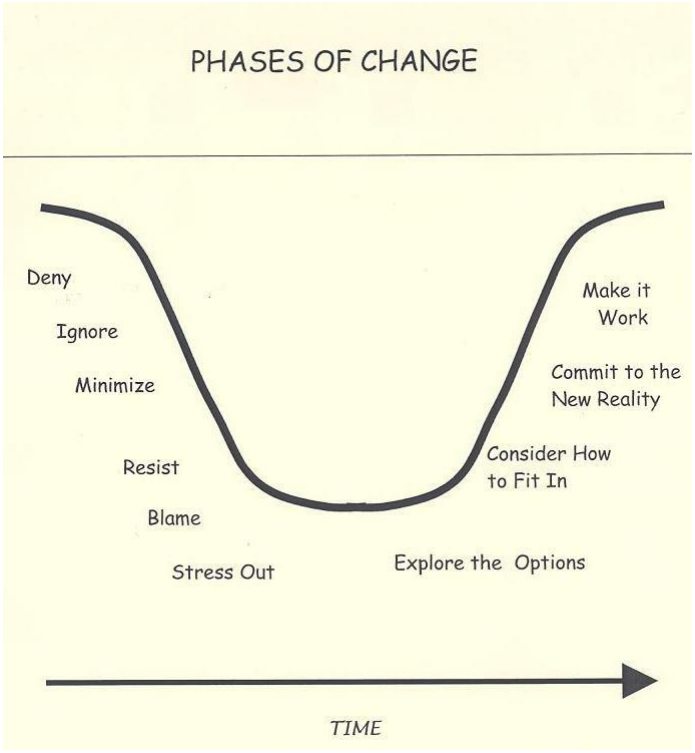


The PROJECT BOX

URL:

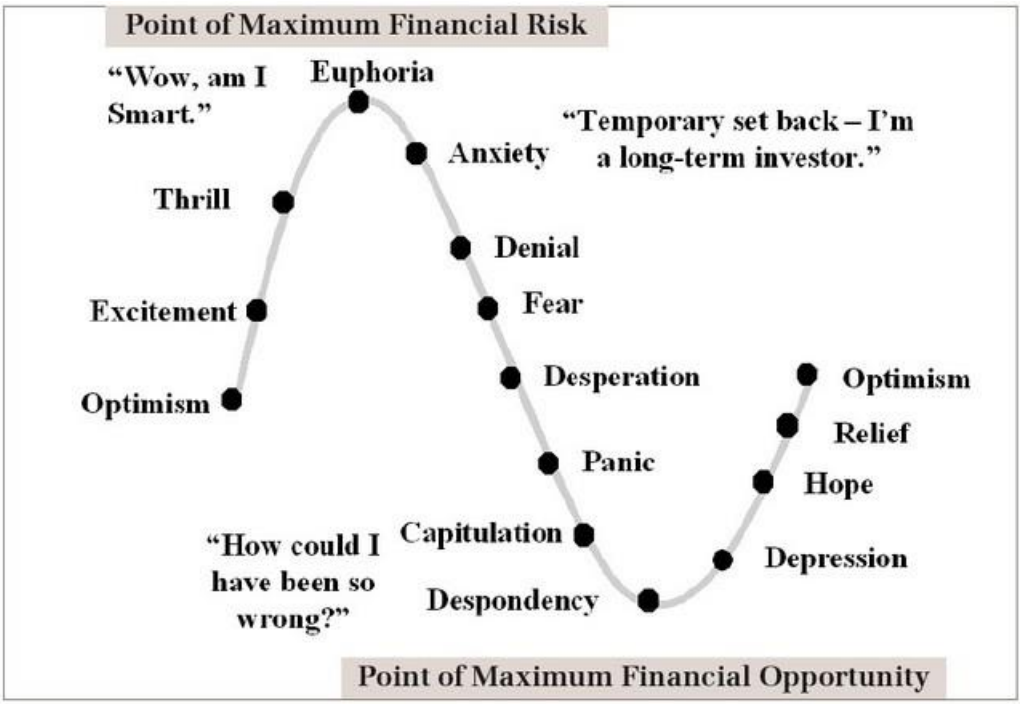
http://www.businessblogshub.com/2010/08/how-can-the-change-management-help-your-project/

Reference: A1-E



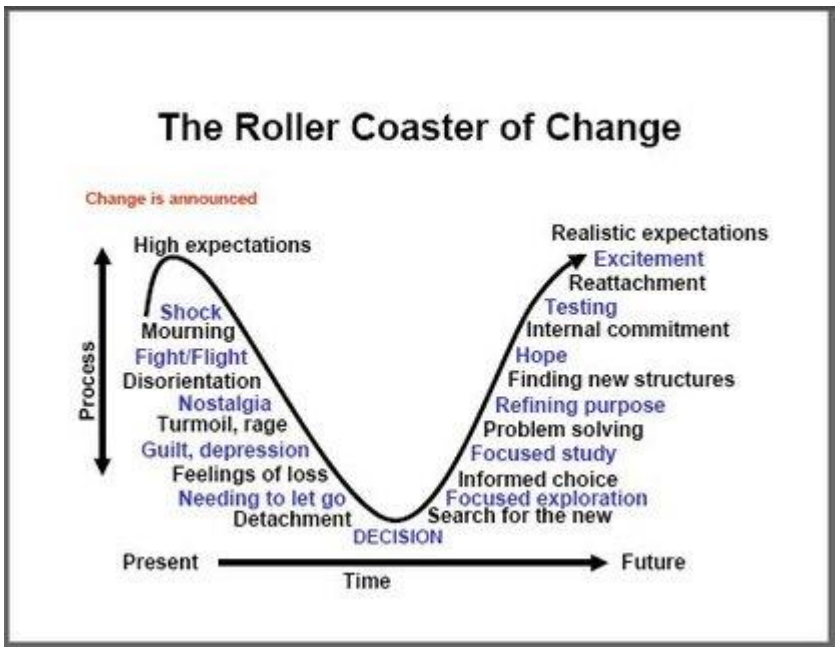
URL: http://pages.uoregon.edu/chappell/change/nwill-notes.html

Reference: A1-F



URL: http://www.ritholtz.com/blog/2010/04/lagging-psychology-at-turning-points/

Reference: A1-G



URL: http://meetmisso.com/?attachment_id=366

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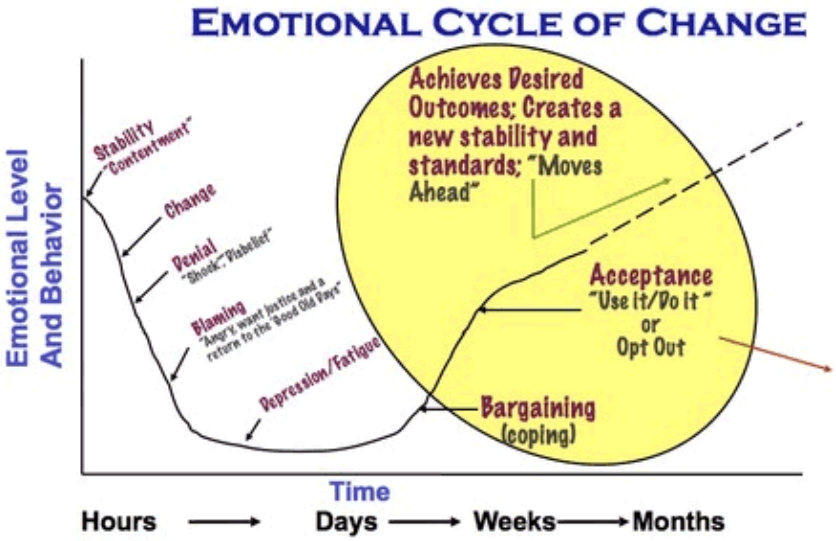
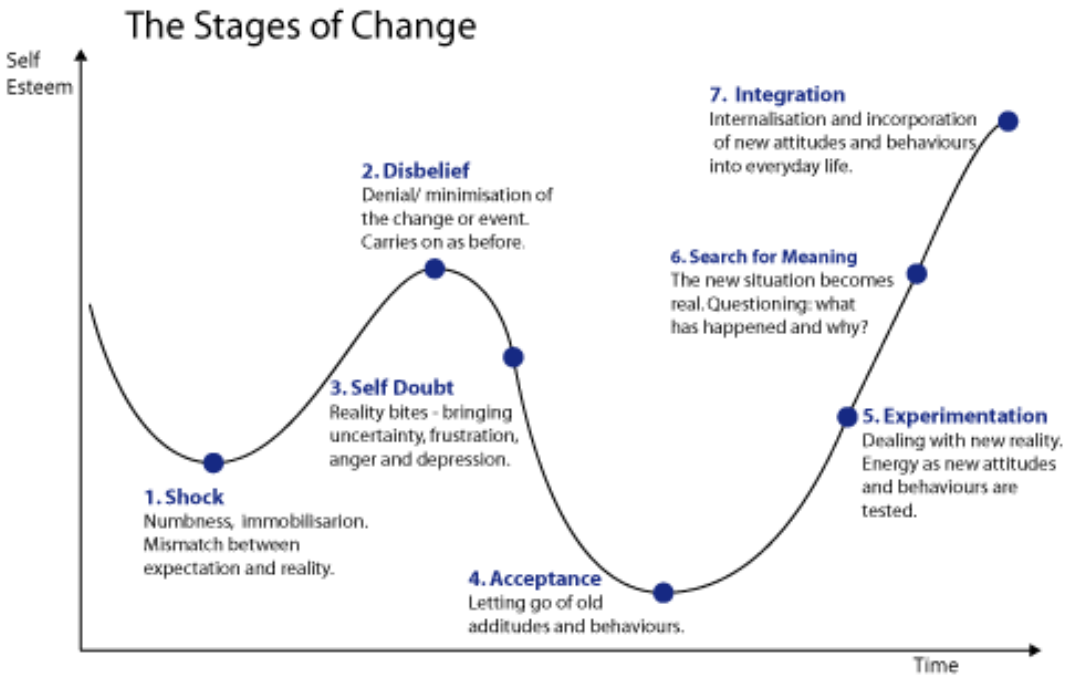


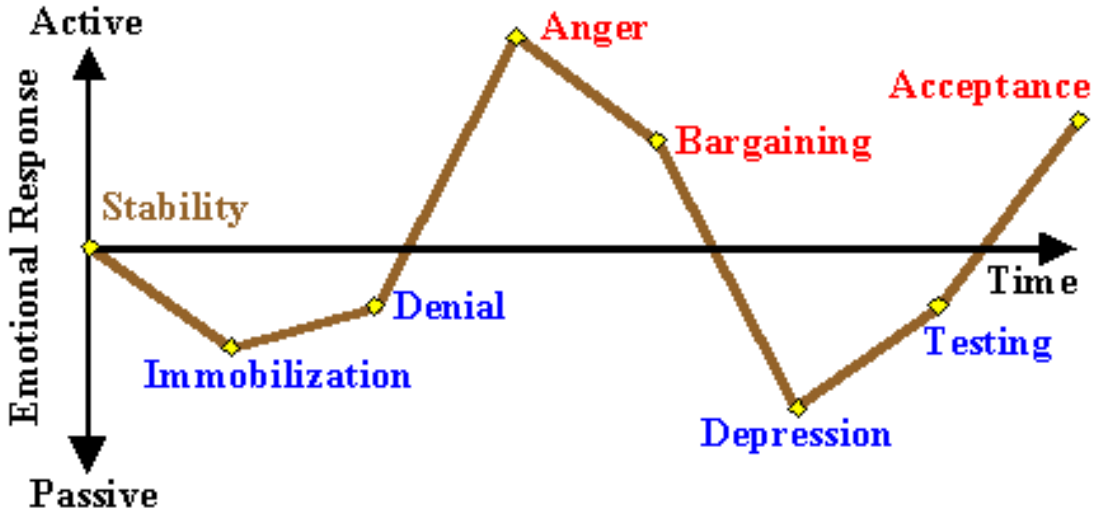
URL: http://www.softducks.com/Emotional-Change-Cycle-Software-soft-56199

Reference: A1-I



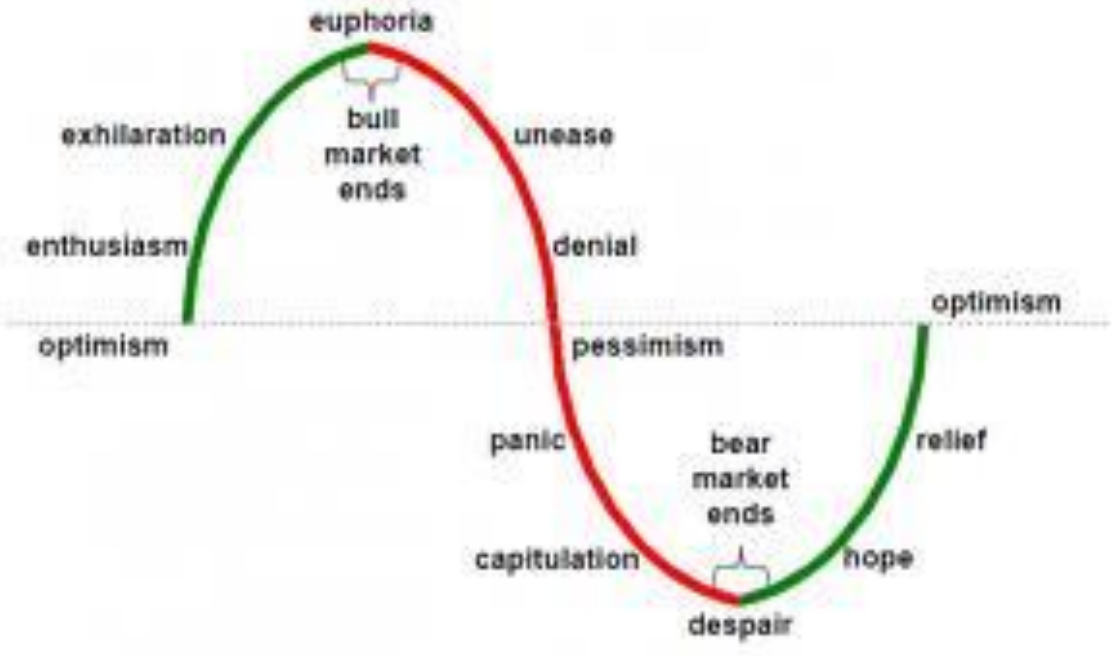
URL: http://www.jobs.ac.uk/careers-advice/managing-your-career/381/career-crisis-3

Reference: A1-J



URL: http://www.epmbook.com/orgchange.htm

Reference: A1-K



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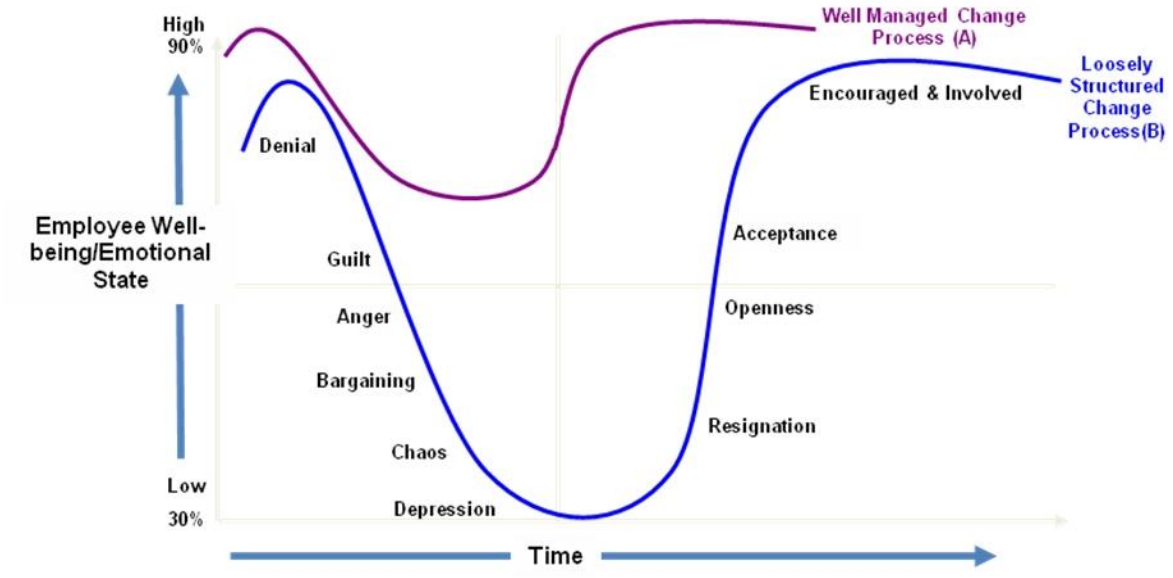

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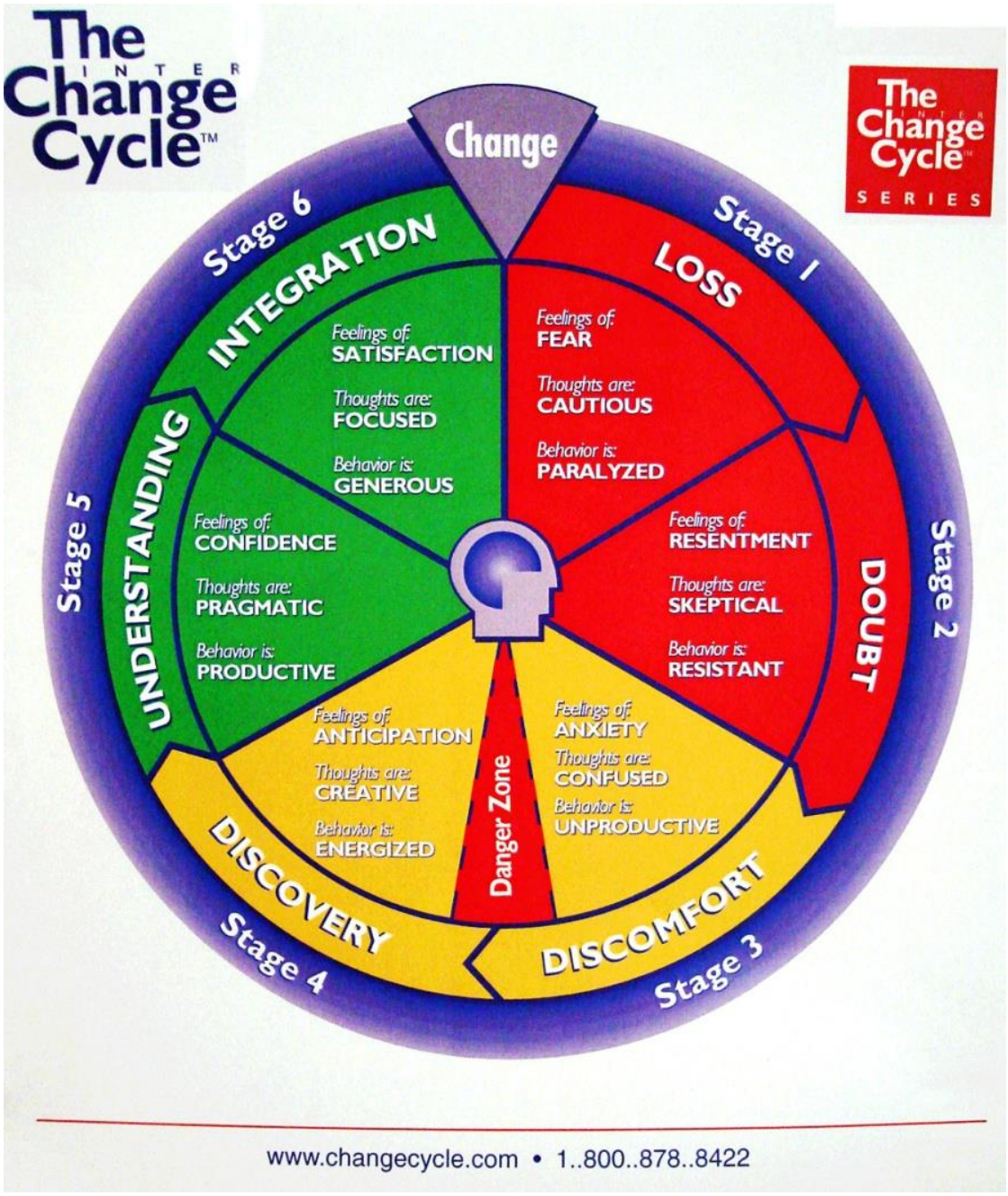

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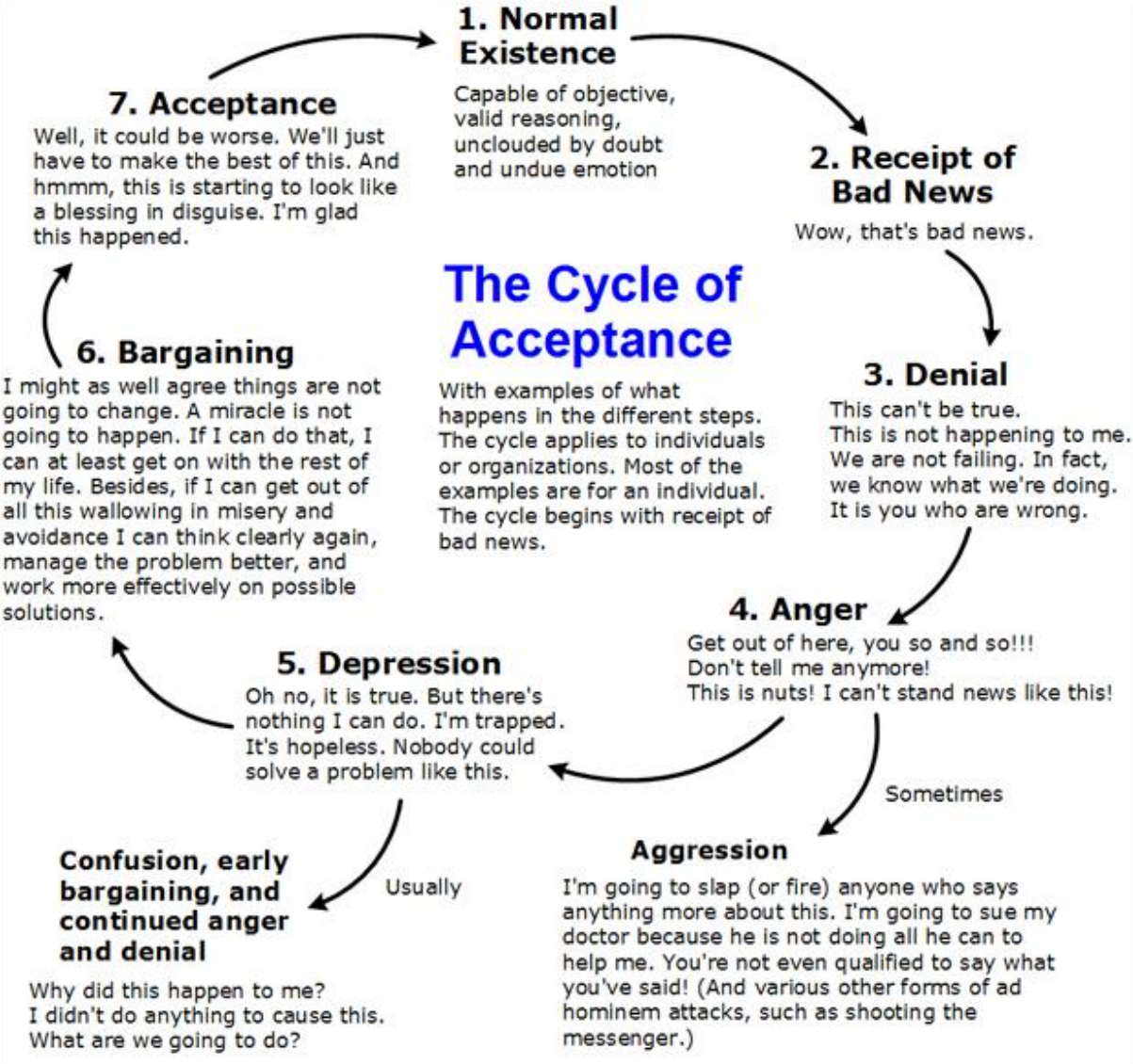
Reference: A1-N



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Appendix 2: Email to Questionnaire Survey Respondents

I am a researcher in the Lean Engineering Research Group at De Montfort University, Leicester. I have been tasked with investigating the potential effects that work area 'interior design' may have on the ability of employees to cope with changes in their work roles, activities and responsibilities.

I am contacting you to ask if you would be willing to complete, (or forward to the relevant person within your company), a short questionnaire (takes less than 10 minutes to complete) intended to identify the likely effects of individual interior design components on the change process.

The aim is to provide a decision tool for selecting interior design components for offices and service environments where employees are undergoing change programmes or where clients are receiving advice concerning lifestyle changes.

The basic design components of interior designs form the basis of questions and the change management needs during each stage of the change process are as follows:

1. Reduce fear & anxiety
2. Reduce resentment & anger
3. Reduce depression & stress
4. Promote bargaining & discovery
5. Promote understanding & acceptance

Would it, therefore, be possible to complete the survey found at URL:
http://www.surveymonkey.com/s/GY2ZQM5

Your individual thoughts on the subject of interior design's effects on the change process would also be welcome.

The table below provides more detail in terms of the words used to describe feelings, thoughts and behaviours of personnel experiencing change.

Many thanks

Kate Stockton
Researcher, Lean Engineering Research Group
School of Engineering & Sustainable Development
Faculty of Technology, De Montfort University
The Gateway, Leicester, LE1 9BH, UK
Tele: 0116 207 8089
www.dmucfm.co.uk

Change management requirement		**Associated feelings, thoughts and behaviours**	**References for change process:**
1	Reduce fear and anxiety	Cautious, Paralyzed, Doubt, Denial, Sceptical, Resistant, Shock, Disbelief	1. http://helenhill.files.wordpress.com/2010/05/changecycle.jpg 2. http://www.thwink.org/su

2	Reduce resentment & anger	Rage, Aggressive, Chaos, Confusion, Blaming	stain/glossary/CycleOfAcceptance.htm 3. http://knowhownonprofit.org/leadership/change/tools/transition 4. http://www.challenge.gov.sg/2011/01/hello-boss-are-you-listening/ 5. http://steveroesler.typepad.com/.a/6a00d8341c500653ef01675ef7fd02970b-popup
3	Reduce depression & stress	Discomfort, Guilt, Anxiety, Unproductive, Despair, Gloomy, Apathetic, Frustration, Fatigue	
4	Promote bargaining & discovery	Anticipation, Creative, Energised	
5	Promote understanding & acceptance	Confidence, Pragmatic, Productive, Hope, Integration, Satisfaction, Focused, Enthusiasm, Involved, Encouraged	

Appendix 3: 'Workplace Interior Design Component Characteristic Selector

The 'Workplace Interior Design Component Characteristic Selector' was developed as follows, i.e. the Colour component is used to describe how the selector functions with all other components using the same approach.

Step 1: A table was constructed using the relationships between Interior Design Components and their Characteristics, Change Management Behaviours and Work Place Areas using information from the 'Number of Responses - Correlation Coefficient Table' of each industrial design component**.** Table A3.1 shows the Characteristics of the Colour component. These characteristics were selected from 'Table 5.5 Correlation Coefficients – No. of Responses – COLOUR'. The characteristics selected possessed the highest 'No. of Responses'. Similar tables were constructed for the other interior design components, i.e. Shape, Material, Seating, Surface and Style.

Interior designers identified which interior work areas were relevant in terms of their effects on the change management process and which specific interior design areas had little effect on change management behaviours, e.g. in term of 'colour' it was considered that the colour of 'windows' and 'décor' would have little effect.

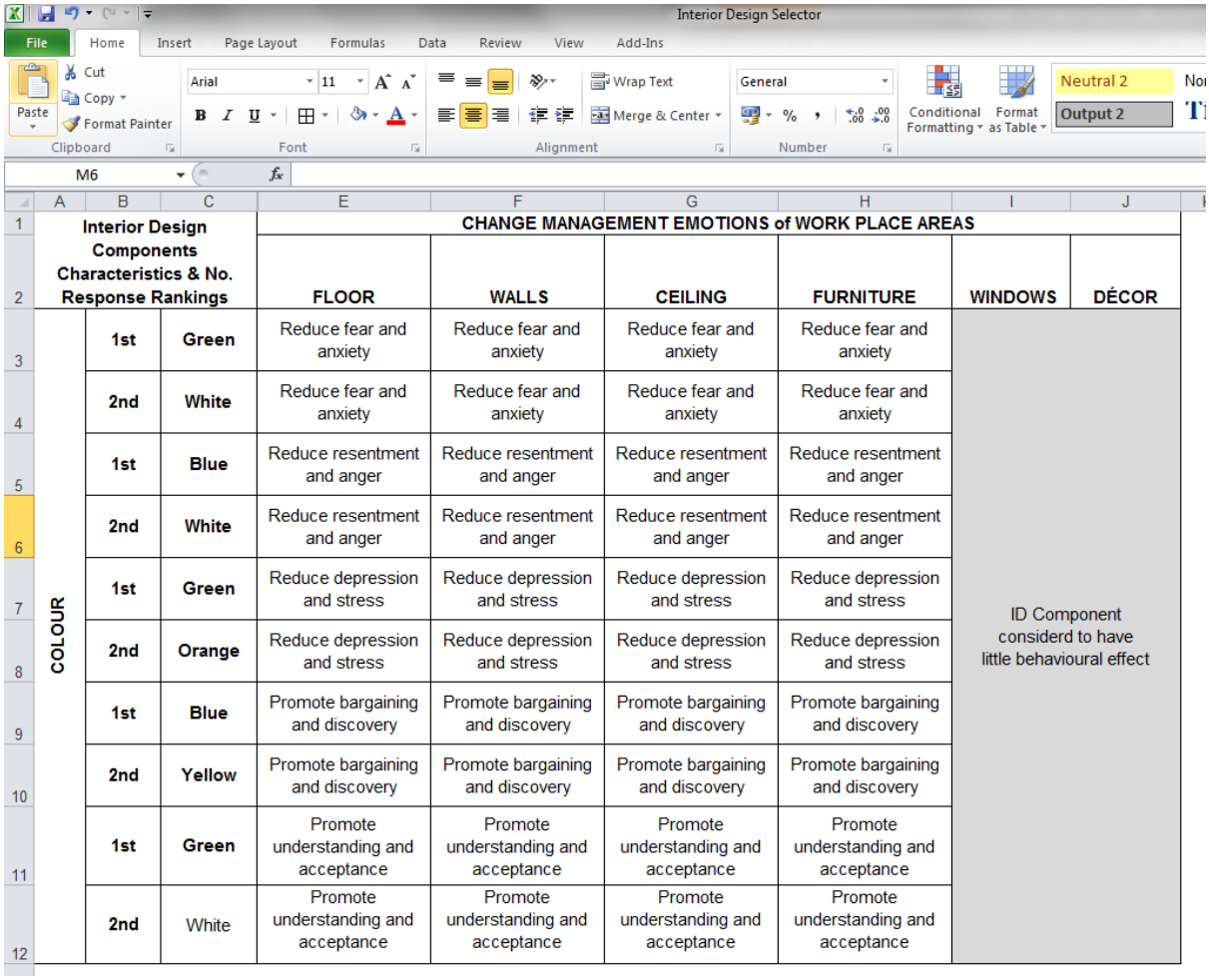
Step 2: Table A3.2 was developed that enabled:

(i) Selection of a 'change management behaviour' from a drop down list of all change management behaviours.

(ii) The selected 'change management behaviour' to be compared with those in cells E3:H12 in Table A3.1.

(iii) A cell having the same change management behaviour' as the behaviour selected in (i) above enabling the copying and pasting, to Table A3.2, of the Component Characteristics' in Column C and the same horizontal cell.

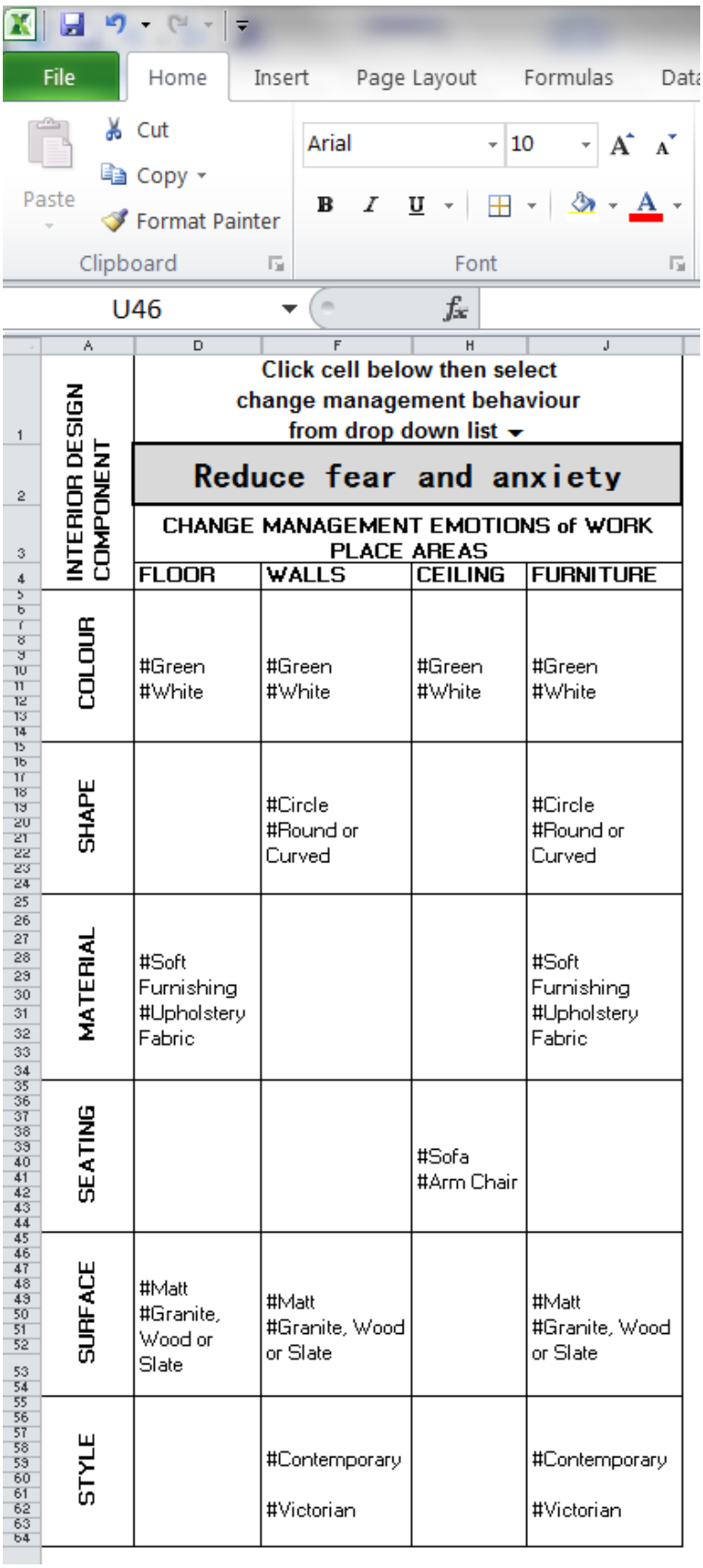
(iv) Tables A3.2 to A3.6 show, for each interior design component the component characteristics selected for each interior design area.



Interior Design Components Characteristics & No. Response Rankings			CHANGE MANAGEMENT EMOTIONS of WORK PLACE AREAS					
			FLOOR	WALLS	CEILING	FURNITURE	WINDOWS	DÉCOR
COLOUR	1st	Green	Reduce fear and anxiety	Reduce fear and anxiety	Reduce fear and anxiety	Reduce fear and anxiety	ID Component considerd to have little behavioural effect	
	2nd	White	Reduce fear and anxiety	Reduce fear and anxiety	Reduce fear and anxiety	Reduce fear and anxiety		
	1st	Blue	Reduce resentment and anger	Reduce resentment and anger	Reduce resentment and anger	Reduce resentment and anger		
	2nd	White	Reduce resentment and anger	Reduce resentment and anger	Reduce resentment and anger	Reduce resentment and anger		
	1st	Green	Reduce depression and stress	Reduce depression and stress	Reduce depression and stress	Reduce depression and stress		
	2nd	Orange	Reduce depression and stress	Reduce depression and stress	Reduce depression and stress	Reduce depression and stress		
	1st	Blue	Promote bargaining and discovery	Promote bargaining and discovery	Promote bargaining and discovery	Promote bargaining and discovery		
	2nd	Yellow	Promote bargaining and discovery	Promote bargaining and discovery	Promote bargaining and discovery	Promote bargaining and discovery		
	1st	Green	Promote understanding and acceptance	Promote understanding and acceptance	Promote understanding and acceptance	Promote understanding and acceptance		
	2nd	White	Promote understanding and acceptance	Promote understanding and acceptance	Promote understanding and acceptance	Promote understanding and acceptance		

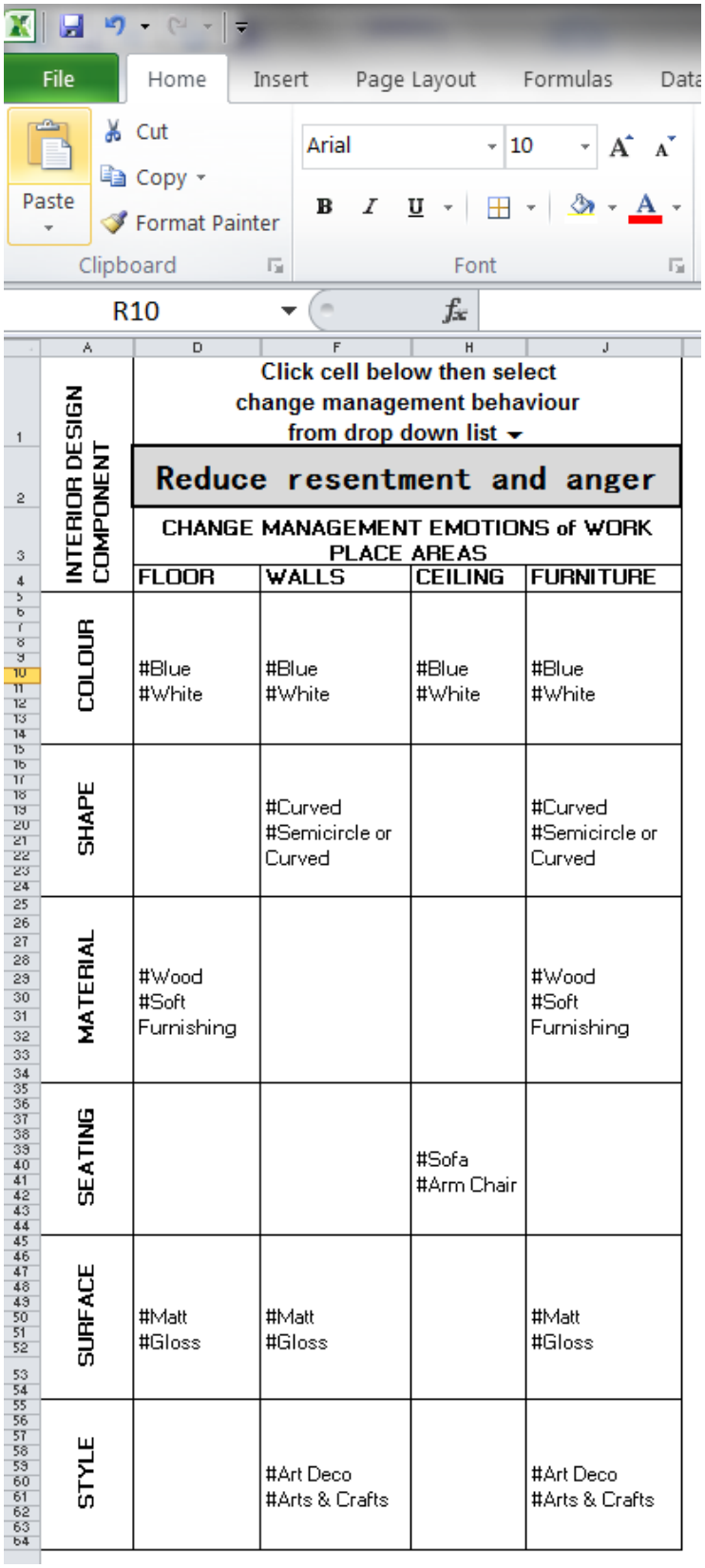
Table A3.1: Relationships between Industrial Design Component Characteristics, Change Management Behaviours and Work Place Areas

Hence, the selector has the capability of extracting interior design component characteristics that have the greatest effect on specific change management behaviours.



INTERIOR DESIGN COMPONENT	Click cell below then select change management behaviour from drop down list ▼			
	Reduce fear and anxiety			
	CHANGE MANAGEMENT EMOTIONS of WORK PLACE AREAS			
	FLOOR	WALLS	CEILING	FURNITURE
COLOUR	#Green #White	#Green #White	#Green #White	#Green #White
SHAPE		#Circle #Round or Curved		#Circle #Round or Curved
MATERIAL	#Soft Furnishing #Upholstery Fabric			#Soft Furnishing #Upholstery Fabric
SEATING			#Sofa #Arm Chair	
SURFACE	#Matt #Granite, Wood or Slate	#Matt #Granite, Wood or Slate		#Matt #Granite, Wood or Slate
STYLE		#Contemporary #Victorian		#Contemporary #Victorian

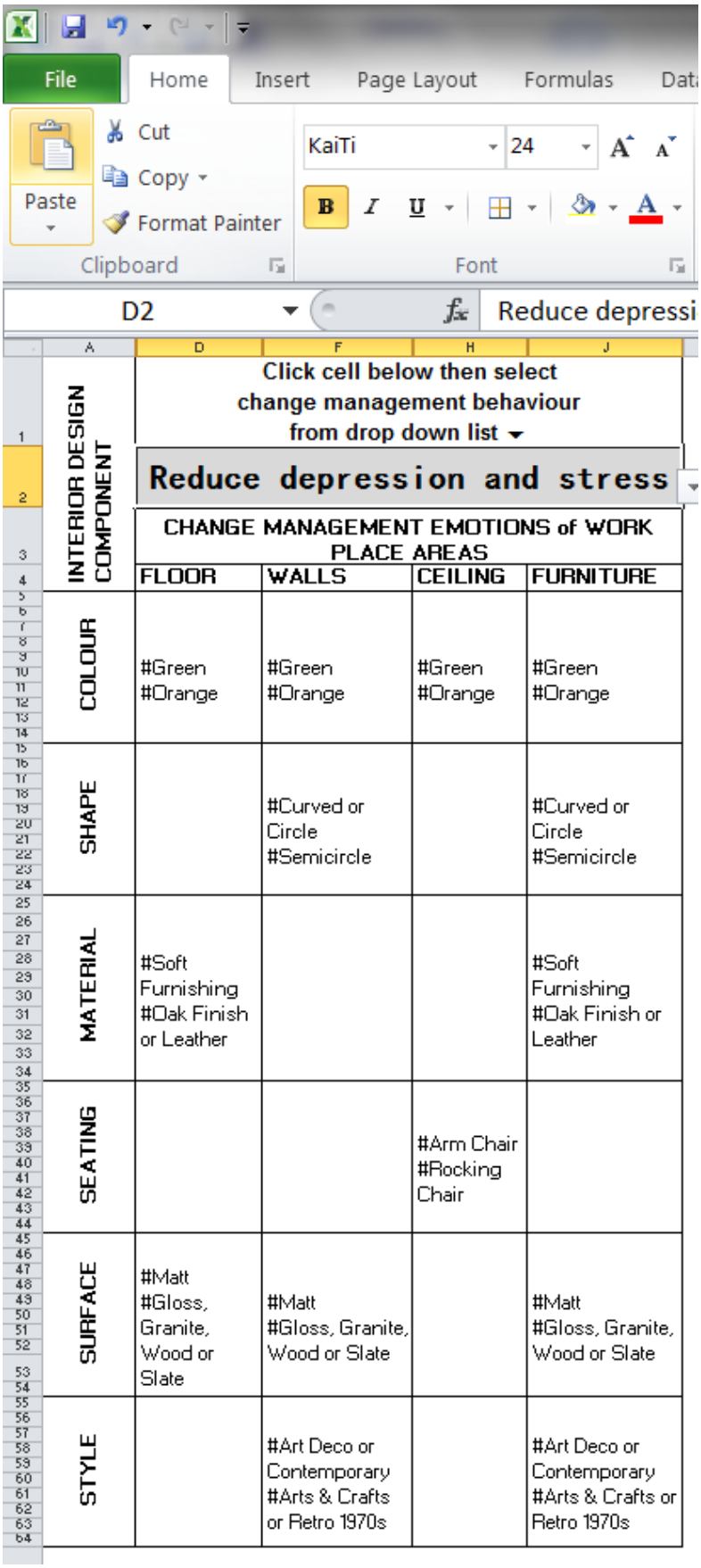
Table A3.2: Change Management Behaviour – Reduce Fear & Anxiety



INTERIOR DESIGN COMPONENT	Click cell below then select change management behaviour from drop down list ▾ Reduce resentment and anger CHANGE MANAGEMENT EMOTIONS of WORK PLACE AREAS			
	FLOOR	WALLS	CEILING	FURNITURE
COLOUR	#Blue #White	#Blue #White	#Blue #White	#Blue #White
SHAPE		#Curved #Semicircle or Curved		#Curved #Semicircle or Curved
MATERIAL	#Wood #Soft Furnishing			#Wood #Soft Furnishing
SEATING			#Sofa #Arm Chair	
SURFACE	#Matt #Gloss	#Matt #Gloss		#Matt #Gloss
STYLE		#Art Deco #Arts & Crafts		#Art Deco #Arts & Crafts

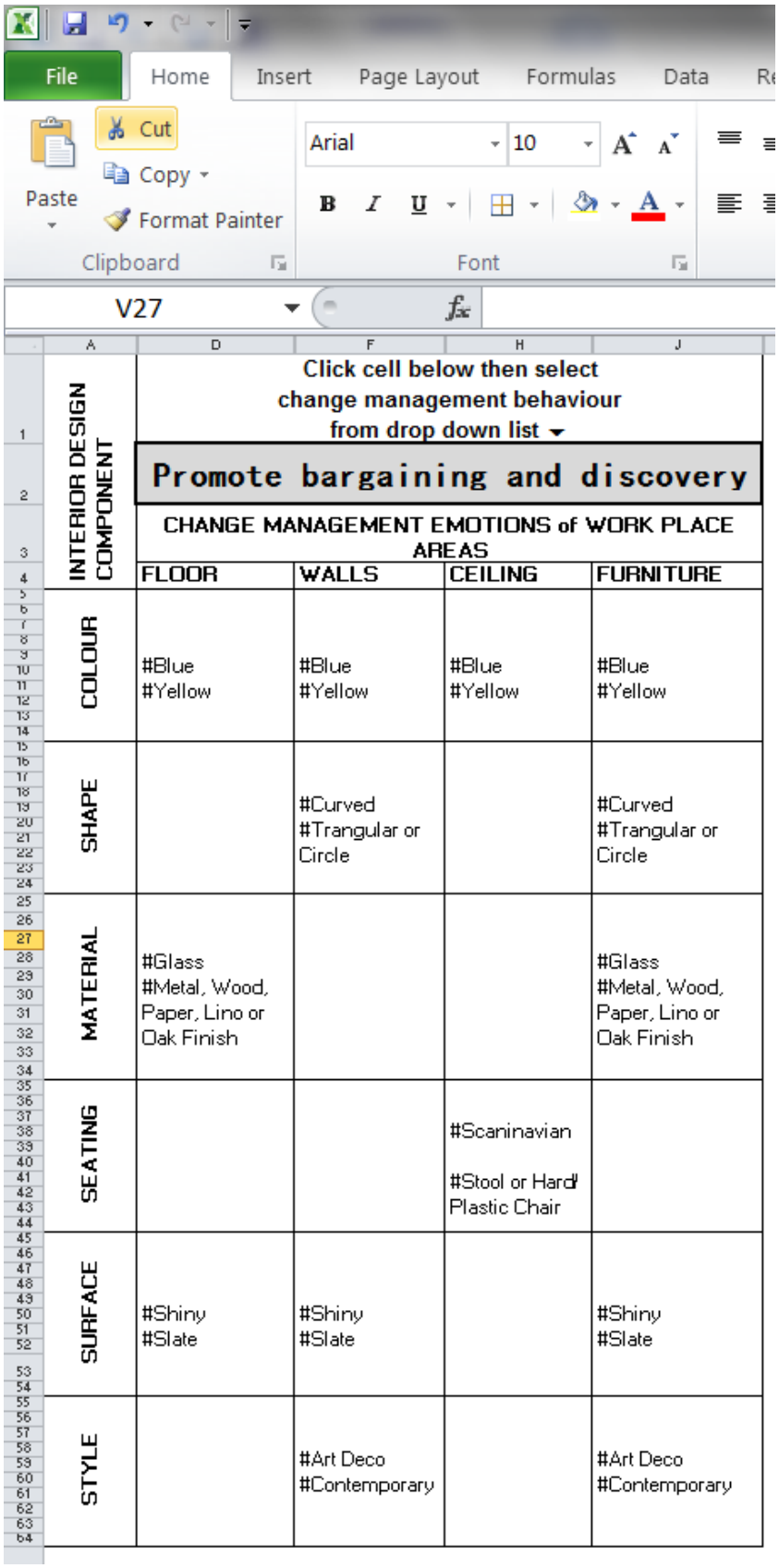
Table A3.3: Change Management Behaviour – Reduce Resentment & Anger

Table A3.4: Change Management Behaviour – Reduce Depression & Stress



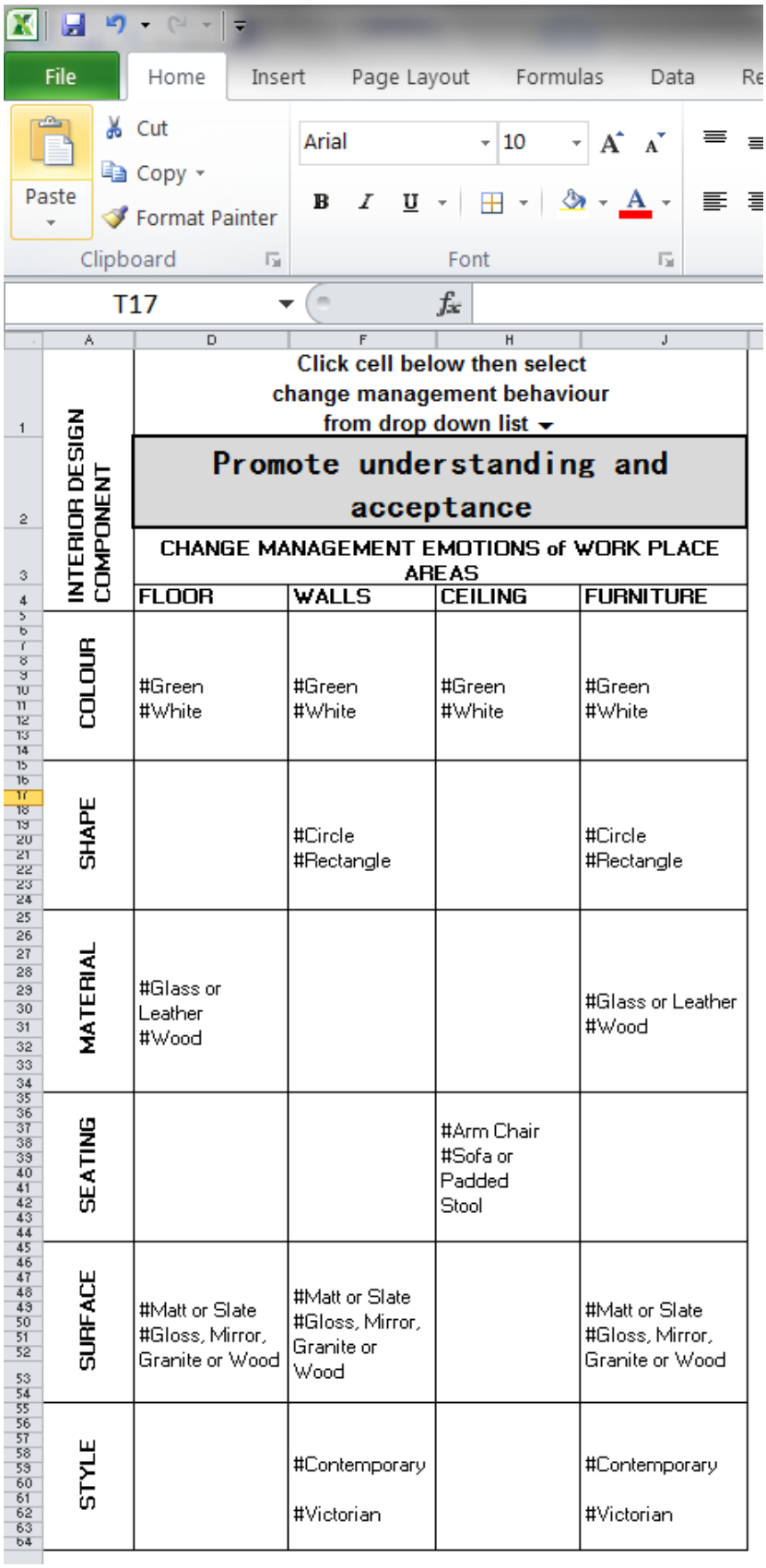
INTERIOR DESIGN COMPONENT	Click cell below then select change management behaviour from drop down list ▼ Reduce depression and stress			
	CHANGE MANAGEMENT EMOTIONS of WORK PLACE AREAS			
	FLOOR	WALLS	CEILING	FURNITURE
COLOUR	#Green #Orange	#Green #Orange	#Green #Orange	#Green #Orange
SHAPE		#Curved or Circle #Semicircle		#Curved or Circle #Semicircle
MATERIAL	#Soft Furnishing #Oak Finish or Leather			#Soft Furnishing #Oak Finish or Leather
SEATING			#Arm Chair #Rocking Chair	
SURFACE	#Matt #Gloss, Granite, Wood or Slate	#Matt #Gloss, Granite, Wood or Slate		#Matt #Gloss, Granite, Wood or Slate
STYLE		#Art Deco or Contemporary #Arts & Crafts or Retro 1970s		#Art Deco or Contemporary #Arts & Crafts or Retro 1970s

Table A3.5: Change Management Behaviour – Promote Bargaining & Discovery



INTERIOR DESIGN COMPONENT	Click cell below then select change management behaviour from drop down list ▼			
	Promote bargaining and discovery			
	CHANGE MANAGEMENT EMOTIONS of WORK PLACE AREAS			
	FLOOR	WALLS	CEILING	FURNITURE
COLOUR	#Blue #Yellow	#Blue #Yellow	#Blue #Yellow	#Blue #Yellow
SHAPE		#Curved #Trangular or Circle		#Curved #Trangular or Circle
MATERIAL	#Glass #Metal, Wood, Paper, Lino or Oak Finish			#Glass #Metal, Wood, Paper, Lino or Oak Finish
SEATING			#Scaninavian #Stool or Hard Plastic Chair	
SURFACE	#Shiny #Slate	#Shiny #Slate		#Shiny #Slate
STYLE		#Art Deco #Contemporary		#Art Deco #Contemporary

Table A3.6: Change Management Behaviour Promote Understanding & Acceptance



INTERIOR DESIGN COMPONENT	Click cell below then select change management behaviour from drop down list ▼			
	Promote understanding and acceptance			
	CHANGE MANAGEMENT EMOTIONS of WORK PLACE AREAS			
	FLOOR	WALLS	CEILING	FURNITURE
COLOUR	#Green #White	#Green #White	#Green #White	#Green #White
SHAPE		#Circle #Rectangle		#Circle #Rectangle
MATERIAL	#Glass or Leather #Wood			#Glass or Leather #Wood
SEATING			#Arm Chair #Sofa or Padded Stool	
SURFACE	#Matt or Slate #Gloss, Mirror, Granite or Wood	#Matt or Slate #Gloss, Mirror, Granite or Wood		#Matt or Slate #Gloss, Mirror, Granite or Wood
STYLE		#Contemporary #Victorian		#Contemporary #Victorian

Table A3.7: Component Characteristics selected - STYLE

	Colour		Shape		Material	
	1st	**2nd**	**1st**	**2nd**	**1st**	**2nd**
Reduce fear and anxiety	Green	White	Circle	Round or Curved	Soft Furnishing	Upholstery Fabric
Reduce resentment and anger	Blue	White	Curved	Semicircle or Curved	Wood	Soft Furnishing
Reduce depression and stress	Green	Yellow	Curved or Circle	Semicircle	Soft Furnishing	Oak Finish or Leather
Promote bargaining and discovery	Blue	Yellow	Curved	Triangular or Circle	Glass	Metal, Wood, Paper, Lino or Oak Finish
Promote understanding and acceptance	Green	White	Circle	Rectangle	Glass or Leather	Wood

	Seating		Surface		Style	
	1st	**2nd**	**1st**	**2nd**	**1st**	**2nd**
Reduce fear and anxiety	Sofa	Arm Chair	Matt	Granite, Wood or Slate	Contemporary	Victorian
Reduce resentment and anger	Sofa	Arm Chair	Matt	Gloss	Art Deco	Arts & Crafts
Reduce depression and stress	Arm Chair	Rocking Chair	Matt	Gloss, Granite, Wood or Slate	Art Deco or Contemporary	Arts & Crafts or Retro 1970s
Promote bargaining and discovery	Scandinavian	Stool or Hard/Plastic Chair	Shiny	Slate	Art Deco	Contemporary
Promote understanding and acceptance	Arm Chair	Sofa or Padded Stool	Matt or Slate	Gloss, Mirror, Granite or Wood	Contemporary	Victorian